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ABSTRACT

The aim of this issue of "Children in the Tropics" is to describe work that may be done by a motivated health team having only the strict minimum of material resources. While not a handbook of obstetrics, this text serves as a reminder of basic information and procedures workers must be able to perform. Following a review of the educational and psychological role of health workers, the discussion offers a description of the progression of the prenatal visit for the first, second, and third trimesters of pregnancy. Discussion then shifts to the management of a normal pregnancy and to what must be done when a risk or pathology has been discovered. Subsequent discussion focuses on the surveillance of labor, delivery, and the puerperium. In conclusion, the importance of planned parenthood is briefly discussed. Appendices provide information about nutrition and pregnancy, medication and pregnancy, medication used in obstetrics, and equipment for the consulting and delivery rooms. (RH)

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# CHILDREN

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Nos 152-153 PREVENTION IN OBSTETRICS

# in the TROPICS

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INTERNATIONAL CHILDREN'S CENTRE - PARIS

The International Children's Centre was created by the French government in 1949, on the initiative of Professor Robert Debré in particular, following negotiations between France and the United Nations. Its purpose was to furnish those international and national agencies dealing specifically with child care with training facilities and educational and informational tools in the field of child health and development, viewing children within their family and surroundings.

ICC soon turned essentially toward Third World children and devoted its activities to the training and education of personnel with social, educational and administrative responsibilities as well as medical and paramedical workers. The desire for greater efficiency has led it to work increasingly with trainers and to concentrate its efforts on the methodological and educational aspects of mother and child care programmes.

ICC is also engaged in an attempt to further study — and — action on some aspects of the life and health of children and their family, so as to contribute to practical improvement, particularly in the fields of growth, nutrition, planned parenthood, the control of transmissible and nutritional diseases, preschool and school education, the needs of disabled and underprivileged children, etc.

Over this period of more than 30 years, a large amount of documents on children and adolescents, mostly from the developing countries, has been accumulated. This international documentation has been classified and sorted out, and has been computerized since 1983 : a bibliographic data base (BIRD : "Base d'Informations Robert Debré") may be consulted anywhere in the world, through international communications networks. ICC also publishes periodicals, educational documents and specialized bibliographic bulletins.

As for its legal status, the International Children's Centre is a foundation under french law of recognized public utility, administered by an executive board with broad international membership.

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### Doctor Luc DESTANNE de BERNIS*


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**Introduction**

For many, many generations, women have given birth under more or less appropriate conditions, in a variety of environments. Despite this fact, gestation and delivery often go well. Mother hood is a normal physiological process. Accidents do occur, however ; some are serious and many might be prevented by relatively simple action.

Obstetrics is the science of pregnancy and childbirth, and its objective is the preservation of the health of the mother and of the child to be born. It represents a high priority field for all those who work at improving people's living conditions and their future. Although obstetrics is concerned with a major event affecting both the individual and the human community as a whole, it is still insufficiently valued in the public health programmes of the developing countries.

It has individual consequences for the woman, first, since she is threatened with the loss of her life, her health or her ability to procreate, which, in some civilizations, means her social status. For the child, too, since he/she is often born particularly vulnerable, sometimes with afflictions that will affect his/her entire life.

The consequences are collective, as well, since no population group can perpetuate itself if it does not reproduce. There is also the very heavy financial burden of ailing or disabled children.

The health of a people may be said to begin in the mother's womb. Indeed, it would be quite illusory to make a great medical effort to save ailing infants when nothing has been done to enable them to be born healthy, at term and with a proper birth weight.

Satisfactory obstetric care may provide great social benefits. Although it requires rather modest means, it may help to solve most problems. Since its role is essentially preventive, it is not a highly technological branch of medicine. Indeed, what is the explanation for the major progress made in obstetrics in the Western countries ?

First, **improved hygiene**, through the understanding of the importance of the basic rules of asepsis, eliminates a great many deaths due to infection in mothers and children (Semmelweis, 1880).

Next, **the multiplication of prenatal consultations** involving complete, regularly repeated check-ups for pregnant women ; these are the only way to prevent accidents. As we shall see, these consultations require no costly means, aside from the health personnel.

Last, a **better understanding** of the physiology of pregnancy and delivery, which, although still quite incomplete, showed those points on which surveillance and management should concentrate.

These are the three main points which enable us to comprehend and solve the great majority of problems, and thus to obtain an extremely effective reduction in the disease and death rates of mothers and infants. All other advances in modern obste-

trics depend upon these, and deal with risks which are far less frequent and for which the cost of detection and treatment is extremely high (echography, amniocentesis, neonatal surgery, etc.).

It should not be forgotten, however, that these advances would never have occurred if they had not been backed by a gradual improvement in people's living conditions : this improvement is the underlying factor behind the other trends. This means that progress in obstetrics in the developing countries will be linked with the improvement of diet, and hygiene, and with the increased awareness of health needs. Obstetrical concerns are inseparable from the basic work done in public health.

The objective of obstetrical prevention is to lower the maternal and neonatal morbidity and mortality rates. On the whole, this prevention must be three-sided : education and preparation for childbirth, prevention of the risks linked with pregnancy and detection of at-risk pregnancies.

**Education and preparation for childbirth** : we must seize every opportunity to attempt to increase men and women's awareness of health issues. There is not doubt that pregnancy is one of the best times for such work. The objectives and methods will of course depend on the socio-economic context and on local customs and beliefs, which must be known if we are to have any chance of being listened to and understood. Local training of public health workers and traditional birth attendants is probably one of the most appropriate solutions.

Discussion of these questions will be initiated whenever possible, during consultation at the clinic, when the health team visits a village, at meetings with the local teacher, the traditional authorities or the local administrator.

**Prevention of the risks linked with pregnancy** : we must be familiar with the physiology and the course of a normal pregnancy so as to avoid the incidents or accidents which may occur during pregnancy, childbirth and the puerperium in a healthy woman with no special personal or familial medical history.

**Detection of at-risk pregnancies** : this is the discovery of all women whose past, personal or familial, medical, surgical or obstetrical history increases the risks connected with pregnancy, as well as those women whose pregnancy has unusual features (multiple pregnancy, for instance), or is complicated by some added pathology.

The risk is then higher for the woman (death caused by placental detachment or ruptured uterus, for example) and for the foetus (risk of intrauterine or neonatal death, risk of prematurity, risk of small size for date, risk of malformation).

Epidemiological surveys are often lacking, and yet such knowledge is essential if we are to define the top priority objectives of prevention : they provide a photograph of the health status of a population group at a given time, and even better, of the evolution of different parameters with time.

We must first decide on what group we should concentrate our efforts. Generally, it is the people living in the suburbs of large cities, characterized by their very low standard of living resulting from uprooting, unemployment and the destruction of the customary structures of social solidarity. Often their situation is worse than that of the rural population.

The tremendous needs of the refugee populations must also be mentioned : their number is rapidly increasing throughout the world, and their situation is most precarious.

**Maternal and infantile mortality rates in different countries**

| Country | Maternal mortality rate (1) | Infantile mortality rate (2) |
|---|---|---|
| Egypt | 84.8 | 103 |
| France | 15.7 | 10.0 |
| Mauritius | 167.4 | 32.9 |
| Peru | 171.6 | 88 |
| Philippines | 142.0 | 55 |
| Thailand | 120.6 | 55 |

(1) Mortality rate for 100,000 live-born infants. These figures are taken from a WHO study (World Health Statistics Annual 1983, WHO, Geneva, 1983) for the year 1977.

(2) These figures are taken from a document entitled "World Population Data Sheet, 1982, published by the Population Reference Bureau, Inc., in collaboration with UNICEF. They represent the number of deaths in children under one per 1,000 live births (infantile mortality should not be confused with neonatal mortality, for which few figures are available in the developing countries).

In the developing countries, the figures for maternal mortality are generally imprecise, since notification is difficult (births occuring at home, lack of follow-up after childbirth, etc.). It is unfortunate that health policies pay so little attention to this question.

Nomadic populations also raise quite delicate problems when regular surveillance is required, and the same is in fact true of some rural areas with an extremely scattered habitat.

Once we have defined our target group, we must set our **priority objectives for prevention**. This means that we must determine which obstetrical pathology is most frequently encountered within this group. This clearly requires close collaboration between epidemiologists, public health physicians and the obstetrical team.

Here, globally, are the objectives which may be set by the health team with respect to pregnancy and childbirth :

— **lowering of the maternal mortality rate :**

- dietary supplementation of undernourished, anaemic women ;
- antimalarial prophylaxis ;
- prevention of ruptured uterus (in women who have borne many children, women with a scarred uterus, detection of operative pelvis) ;
- prevention of placental detachment and of eclampsia (detection of gestational high blood pressure) ;
- prevention of accidents in women with heart disease, tuberculosis or diabetes ;
- prevention of haemorrhaging during the puerperium ;
- prevention of infection during the puerperium ;
- detection and treatment of women with a stillborn foetus

— **lowering of the neonatal morbidity and mortality rates** ; that is, a decrease in **death in utero, prematurity** (1), **small size for date** (hypotrophy) (2) and malformations. This requires :

(1) Birth before 8 months (36 weeks of amenorrhoea).

(2) Birth weight below the 10th percentile of the growth curve for the country. The international organizations consider a child to be at risk when the birth weight is 2,500 g or less for a normal duration of gestation.

- the treatment of all of the above-mentioned maternal pathologies ;
- the detection of infections during pregnancy ;
- the close surveillance of primiparas, women who have borne many children, pregnancies in adolescents (1) and older women (2).

All of these objectives must be well defined and classed by order of priority depending upon the needs of a given group ; that is, on the basis of a serious epidemiological survey of the population group involved.

They may only be achieved by in-depth work tending to make people aware of the need for surveillance of pregnancy and childbirth, be it at home, in rural maternity units or in hospital. However, these people must be able to turn to a health team fully conscious of what it may accomplish and properly trained in public health (hygiene, nutrition, epidemiology) as well as in obstetrics, so as to be in a position to comprehend all of the problems involved in pregnancy and childbirth.

In the forthcoming chapters, we shall attempt to describe all of the work which may be done by a motivated health team with only the strict minimum at its disposal, with respect to material means. This is definitely not a handbook of obstetrics, then, but more simply a reminder of basic information and of the motions which workers must be able to perform in such a context. Following a review of the educational and psychological role of the health workers, we attempt to describe the **progression of the prenatal visit** for the first, second and third trimesters, based on the previously set priority objectives. We will then see how to manage a normal pregnancy and what to do when a risk or some pathology has been discovered. We will then study the surveillance of labour, delivery and the puerperium. In conclusion, we will briefly discuss the importance of planned parenthood.

**All of the results of the work of the health team should be susceptible of evaluation.** Their study enables the a posteriori verification of the appropriateness of the objectives, or on the contrary, they will show that errors led to a poor definition of the objectives or to insufficient results although the objectives were appropriate. Such an evaluation is fundamental for all serious, effective action ; it can only be based upon perfectly kept individual records during prenatal visits, birthing and the puerperium. **The establishment of such records is therefore one high priority task for the health team.**

Thanks to the examination of these records :

— **at the individual level,** we may see whether the pregnancy progressed properly, thanks to simple parameters, correctly measured and noted, detect the occurrence of any anomaly, coordinate the work of different agencies (social centre, hospital, for instance). This is indispensable for the definition of specific, valid management for each case, avoiding errors and waste of time ;

— **at the community level,** we may refine the knowledge of the health team : the most severe and most frequent pathological problems, the most effective means of surveillance and their limits, the most beneficial treatments and the undesirable attitudes. Everything we learn when studying these records will be

(1) Before age 15 or 17 years.

(2) After age 40, or earlier, depending on the "physiological age".

used to refine our definition of the best means of advancing further in the future. **These records must therefore be established collectively** : each parameter must have the same meaning for the entire staff (nursing aides, nurses, midwives and physicians). The entire staff is also concerned by the study of these records, which is real work, since it is the basis for reflexion, and therefore for professional advancement.

Throughout this issue, we will therefore place emphasis on those parameters which are most simple and most effective for surveillance, and discuss their limits as well as the meaning and implications of their variations. Indeed, it is not enough to collect large quantities of data ; we must know how to use them.

# I. THE EDUCATIONAL AND PSYCHOLOGICAL ROLE OF THE HEALTH TEAM

During the prenatal visit, before or after the medical part of it, a meeting is arranged for the women (and their husbands when they are present). The job of the health official is then to encourage exchanges between the women, on the subject of their experience, their problems and their anxieties. The health agent will then use what he/she has heard and his/her own impressions to calm anxieties, correct errors or provide responses.

Some very important points should be dealt with throughout pregnancy :

— **hygiene** : washing up, using clean or boiled water when possible, avoiding bathing in stagnant water or in water known to be infested, taking living and working conditions into consideration ;

— **diet** : the need for a healthy diet, meaning sufficient amounts and a well-balanced diet (see Appendix 1) ;

— **breast-feeding** : explain its advantages for the child's proper development, how primiparas may prepare for it (massages, preparation of the nipple). The beginning of a pregnancy is also a good time to discuss the question of **weaning the last-born**, often linked with this occurrence (there is a widespread belief that a pregnant woman's milk goes "bad"). Gradual weaning, varying the child's diet, etc., should therefore be explained ;

— **vaccination** : the importance of vaccinating the mother against tetanus, and of vaccinating children ;

— **planned parenthood** (see chapter V) ;

— **venereal diseases.**

"Educational" work is most important, then, but this contact through friendly talks between the health team and pregnant women also dissipates much of the anxiety experienced by an expectant mother : this attitude provides much psychological and emotional comfort. This is not a negligible aspect of the question, since it may avoid a whole series of incidents during pregnancy and many cases of dystocia (1) (and consequently of foetal suffering) during labour. This is no luxury ; it is real preventive work, requiring the training of health workers capable of providing responses and information on :

— **the physiology of pregnancy ;**
— **the course of childbirth ;**
— **the importance of prenatal visits** and the meaning of what is done during these.

---

(1) Dynamic dystocia : abnormal uterine contraction and cervical dilatation during labour.

The obstacles to such work are often a shortage of workers in maternity units, but sometimes, too, a poor definition of objectives, privileging the purely medical aspects.

Education and preparation for childbirth must be a full-fledged objective for the health team ; this work has a short-term effectiveness for the proper course of the present pregnancy and a longer-term effectiveness by increasing people's awareness of the need for prenatal visits and for giving birth in a maternity unit. It is a fact that women are the best propagandists for the work of the health team in the maternity unit.

# II. PRENATAL VISITS

## 1. GENERAL INFORMATION

1.1. How many prenatal visits ?

A minimum reasonable objective seems to be four visits covering the entire period of pregnancy :

— 1st visit before the 3rd month ;
— 2nd visit during the 6th month ;
— 3rd visit during the 8th month ;
— 4th visit during the 9th month.

The ideal would seem to be one visit a month from the 3rd month on, and every two weeks during the 8th and 9th months. Indeed, close surveillance of pregnancy can only be achieved through prenatal visits, at which any abnormal event in its course may be detected early.

However, these objectives come up against the realities :

— the number of health centres is insufficient, and not only do people live at great distances, but travel is difficult ;
— there are not enough health workers.

1.2. Who conducts them ?

The prenatal visit always involves the same acts, some of which may be done by non-specialized workers (nursing aides), while others will be reserved for nurses, midwives and/or physicians.

Only by establishing routine visits at which tests are always done in the same order and their results carefully noted on a clear, simple but complete individual record card can we be sure to neglect nothing and to work rapidly.

1.3. What is done at a prenatal visit ?

It furnishes the basis for obstetrical prophylaxis and screening. It always follows the same pattern. All findings are carefully noted.

**Nursing aide**

— Surname, given name, age ;
— Weight and analysis of weight gain ; it is often difficult to determine the woman's weight before pregnancy (fig. 3) ;
— Height (above or below 1.50 m) ;
— Date of last menstruation (LM) and calculation of the term ;
— Uterine height (UH) (fig. 2A and 2B) ;
— Foetal heart sounds (FHS) and foetal movement (FM) ;
record + when present, and − when absent
— Blood pressure (BP) and pulse ;
— Colour of mucosa ;
— Oedema of the lower limbs, fingers or face.

**The record** should provide a simple, easy means of noting all of these data. A recapitulative chart on the wall may be valuable.

**The midwife or physician**

**Questioning,** in order to determine :

— the course of previous pregnancies (miscarriage, haemorrhage, high blood pressure, diabetes, etc.) ;
— the course of previous deliveries (number of children, living and deceased, circumstances of deaths, term of deliveries, birth weights, caesarean sections, and when possible, account of surgical operations, forceps, torn perineum, postpartum haemorrhage, etc.) ;
— the puerperium (infection, haemorrhage, problems with breast-feeding, etc.) ;
— any illness, personal or in the family ;
— medications taken (marketplace remedies) ;
— antitetanus vaccination ;
— the course of the present pregnancy, bleeding, fits of malaria (see paragraph 3.8.), urinary disorders (burning sensation, haemorrhages), digestive disorders (diarrhoea, nausea, vomiting), fatigue, uterine contractions.

**General examination**

This involves checking for malnutrition (weight, skin fold), anaemia, heart murmur (rheumatic fever, etc.), a pulmonary ailment (tuberculosis, etc.), a skin ailment, goitre, venous pathology, any morphological anomaly.

**Gynaecological examination**

It involves :

— placing a speculum in order to detect any vaginal infection (risk of premature rupture of the membranes and of premature delivery), or a scarred cervix (sequela of a difficult delivery) ;

— vaginal examination (VE), to determine the state of the cervix (opening, length, location) and the volume of the uterus ;
— inspection of the perineum (scar).

**Laboratory tests**

None should be requested routinely ; each request should be based on a specific clinical context. It should always be possible to determine the blood group, however. In addition, one urinary bacteriological test per pregnancy and a blood test for toxoplasmosis are desirable.

— blood group and rhesus ;
— testing for **irregular agglutinins** (antirhesus antibodies or, more specifically, anti D antibodies) in rhesus-negative women (1). Unfortunately this test requires sophisticated, costly equipment which is often not available ;
— **measurement of haemoglobin** when the woman is pale, or routinely, since nutritional anaemia is quite frequent and has major obstetrical and paediatric consequences ;
— urinary albumin in case of high blood pressure ;
— sugar in urine if diabetes is suspected or in case of obesity ;
— **urinary cytobacteriology** (UCB) : in case of urination disorders or, preferably, at least once per pregnancy, routinely, when possible, since most urinary infections during pregnancy are silent, and their consequences are well known (uterine contractions, opening of the cervix, premature delivery) ;
— **thick drop ;**
— **examination of the faeces for parasites** : amoebiasis, ancylostomiasis ;
— lung x-ray or examination of sputa (gastric tubage) if tuberculosis is suspected ;
— **blood test for toxoplasmosis** (2) : some simple, sufficiently reliable tests may be used for detection, which is important since treatment with Spiramycin (Rovamycin ®) is feasible during pregnancy, thus avoiding damage to the foetus (Appendix 3).

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(1) **Testing for irregular agglutinins** in a rhesus-negative woman is necessary when a miscarriage is involved and/or a previous childbirth without prevention by anti-D immunoglobulins (their recording on the individual record card is compulsory). If the test is positive it should be repeated one month later. In case of an increase in irregular agglutinins, foetal surveillance should be confided to a specialized centre. This is **rhesus isoimmunization**.

(2) Blood test for toxoplasmosis : the laboratory diagnosis is based on use of a toxoplasmosis colloid as an antigen.

**Fulton's agglutination test** is easy to perform, its results are expressed in terms of levels of dilution (the highest level of dilution of the sera studied which still produces a positive response). This reaction is positive during the days following infestation. The levels vary with the manipulation conditions, but the reaction is generally positive at 1/16th.

An **intensely positive level** indicates active toxoplasmosis, requiring treatment.

If the blood test is **slightly positive**, the test should be repeated 15 to 20 days later. A stable level generally is a sign of longstanding immunity, while an increase is a sign of the onset of toxoplasmosis, requiring treatment. Even better, it may be possible to send the serum to a well-equipped laboratory for measurement of IgM ; these only persist for 3 to 6 months, and their presence definitely confirms the existence of active toxoplasmosis.

## 2. THE FIRST TRIMESTER

The first visit for a pregnancy must provide answers to three questions : is this woman pregnant ? when will she give birth ? what is the prognosis for this pregnancy ?

2.1. Is this woman pregnant ?

Two elements provide the answer :

— **a delay in menstruation** : this element is most important when the cycles are usually regular, but can no longer be used as a signal when the menstrual cycles (1) are quite irregular or when the pregnancy begins during a period of amenorrhoea (2) (during breast-feeding, for instance) ; when haemorrhaging occurs at the beginning of pregnancy, it may be erroneously confused with menstruation. This is relatively frequent ;

— **an increase in the volume of the uterus** : this actually begins after six weeks of amenorrhoea (that is, 15 days after a missed period when the cycles usually last four weeks). The uterine body becomes rounded and is therefore felt through the lateral fornix of the vagina (fig. 1A and 1B).

**Figure 1A : increased uterine volume (Noble's sign)**

Source : R. MERGER, J. LEVY, J. MELCHIOR. Précis d'obstétrique. Masson. Paris. 1974.

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(1) Menstrual cycle : the time between two periods (menses). There are two phases : the folliculin phase (secretion of oestrogens only), followed by the luteal phase (secretion of oestrogens and progesterone), separated by ovulation (on the 14th day of a 28-day cycle).

(2) Amenorrhoea : absence of menstruation.

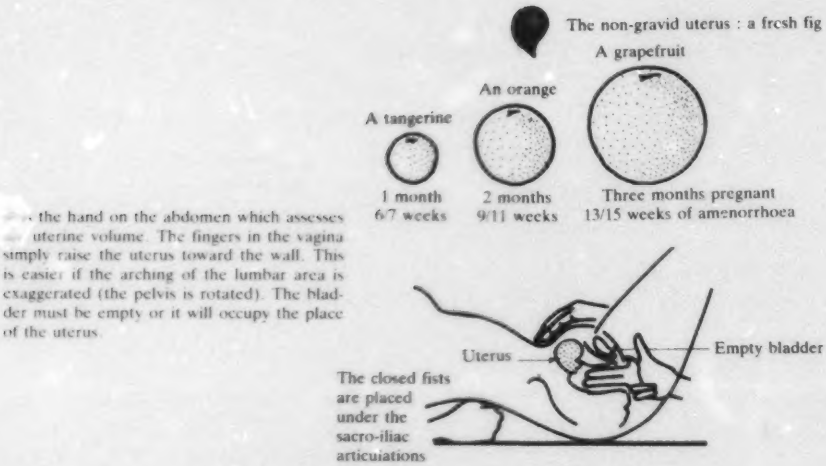


**Figure 1B : increased uterine volume**

Source : Y. MALINAS. La consultation prénatale et le médecin praticien. Le concours médical n° 47 (supplément). 26.12.1981.

Toward the twelfth week, the floor of the uterus may be palpated just above the pubic symphysis. It will rise gradually, by about **4 cm per month**, reaching 16 cm at then end of the 4th month (19th week), 20 cm at the end of the 5th month (23 weeks), then reaching the navel (Fig. 2A and 2B).

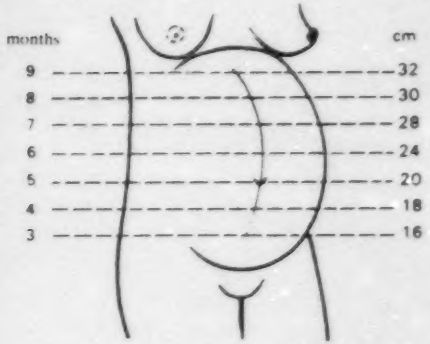


**Figure 2A : uterine height**

Source : J.C. CAZENAVE. Ph. BARNAUD. Dépistage des grossesses à risques outre-mer. In Soins, Pathologie tropicale n° 47. Mai-juin 1984.

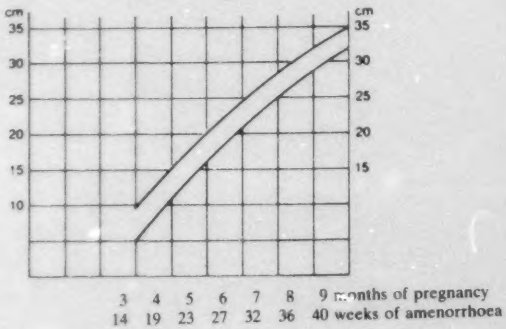


**Figure 2B : uterine height**

Source : Y. MALINAS. La consultation prénatale et le médecin praticien. Le concours médical n° 47 (supplément). 26.12.1981.

The diagnosis may be difficult :

— the examination may be delicate in case of a retroverted, bound uterus and also in obese women ;
— an excessively large uterus may suggest a more advanced pregnancy, twin pregnancy, molar pregnancy (1) or a pregnancy accompanied by a tumor (ovarian cyst, uterine fibroma) ;
— a conpiscuously uterus is suggestive of a pregnancy less advanced than indicated by the last period, halted pregnancy or amenorrhoea without pregnancy (an anovulatory cycle, for instance).

In all of these cases, it is often the clinical course (provided we see the woman again) which decides. Several other signs should not be neglected : vomiting at the beginning of pregnancy, enlargement of breasts (often women say they become more beautiful), the development of a brown line on the abdomen.

2.2. When will the woman give birth ?

The determining, as accurately as possible, of the exact theoretical term of the pregnancy is a part of prevention. Indeed, it conditions decisions on management in case an anomaly occurs at the end of the pregnancy, during a threat of premature delivery (a frequent occurrence), or when a prolonged pregnancy is suspected (this is rare). The term may be set at **9 months and 10 days after the first day of the last period**. Some people prefer to calculate the number of weeks of amenorrhoea. The term is then set at **41 weeks of amenorrhoea**. Still others express it in moons. Amenorrhoea then lasts **9 moons** .

When the pregnancy is more advanced it is much more hazardous to determine its term. Uterine height is a good indicator of foetal growth, but is imprecise with respect to the term. Echography, when it is possible, provides accurate information on the term between 12 and 15 weeks, but is less accurate thereafter. Radiography of the uterine contents after 6 months of pregnancy may provide valuable help by determining the date of appearance of a number of ossification points :

— the calcaneal point : between the 24th and the 26th week ;
— the astragalar point : between the 26th and the 28th week (these two points are clearly visible from the 30th week on) ;
— Beclard's point (the inferior femoral epiphyseal point) ; after the 36th week (end of the 8th month) ;
— Todt's point (superior tibial epiphyseal point) : starting from the 38th week (in 60 % of at-term foetuses) ;
— the cuboidal point : at 41 weeks.

2.3. What is the prognosis for this pregnancy ?

2.3.1. **The short-term prognosis** may be threatened by **haemorrhaging :**

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(1) Molar pregnancy : this is an anomaly of the ovum, characterized by the absence of an embryo, the transformation of the chorionic vollosities into a cystic form, and trophoblastic proliferation.

The beginning of the pregnancy is normal, but it rapidly becomes "toxic", with excessive nausea and vomiting, haemorrhaging with red blood, painless and repeated. Upon examination the uterus is soft, far too large for gestational age, and both ovaries are enlarged. If the prolans, or chorionic gonadotropins (HCG) could be measured, an extremely high level would be found.

The treatment is **uterine suction**, which must be complete. Curettage is formally contra-indicated, since there is a very great risk of perforation of the uterus.

— **the cervix is closed, there is no pain : simple surveillance** (echography has shown that this often corresponds to the elimination of one ovum, since many pregnancies are gemellary at the beginning) ;
— the cervix is open, there is abdominal-pelvic pain : **probable spontaneous miscarriage** ;
— haemorrhage with red or black blood and abdominal-pelvic pain and perception of a painful latero-uterine mass during vaginal examination : **probable extrauterine pregnancy** (requiring evacuation to a surgical centre).

It is most important to urge a woman who bleeds at the beginning of pregnancy to consult :

— in most cases she will be reassured when her pregnancy does not seem to be threatened ;
— she will receive care in case of late or incomplete expulsion of a dead ovum : this prevents uterine infection and secondary sterility (by curettage under general anaesthesia, with or without antibiotherapy). Prevention of rhesus isoimmunization (1) should not be neglected : a standard dose of anti-D immunoglobulins should be injected into all rhesus-negative women ;
— she will be operated in time in case of an extrauterine pregnancy, the rupture of which, as we know, is usually fatal (producing internal haemorrhaging).

The short-term prognosis is more rarely threatened by **gravidic vomiting** :

— this is usually benign. Advice should be given on diet (fractioning of meals) ;
— it is occasionally severe, and may affect general health, especially when the woman is undernourished ;
— it may be connected with acute appendicitis, acute pancreatitis, viral hepatitis or gallstones, requiring transferral to a specialized centre ;
— when isolated and severe, it requires the suppression of all food, with compensation for all fluid and ion losses, intravenous perfusion of proteins. The patient should be completely isolated (no light, no visits, no reading), and given Dogmatil$^{R}$ (Sulpiride) (3 IM ampules a day, then 3 capsules/day when eating is resumed), for this syndrome is often linked with an acute mental conflict.

2.3.2. The longer-term prognosis

This depends on the mother's past history and on all of the ailments which influence the course of the pregnancy, childbirth and the puerperium. Questioning, the general examination, the obstetrical examination and the laboratory tests distinguish between perfectly normal pregnancies (in which complications may always occur later) from at-risk pregnancies (for the mother, for the child or for both). It is for the detection of **at-risk pregnancies** that regular consultations are organized and obstetrical records kept for each patient.

---

(1) Rhesus isoimmunization : a rhesus-negative woman may be immunized against the rhesus factor during her first pregnancy if she is carrying a rhesus-positive child. This causes the massive destruction of the foetal red blood cells (haemolysis) during the second pregnancy, producing foetal death (FD). The injected anti-D immunoglobulins destroy the rhesus-positive foetal red blood cells which have entered the mother, and thus prevent immunization of the latter.

To sum up, the aim of the visit during the first trimester of pregnancy is :

— to diagnose the pregnancy ;
— to calculate its term ;
— to establish its short and long term prognosis ;
— to detect anaemia ;
— to begin the weight curve ;
— to take blood pressure and pulse ;
— to eliminate parasites and do prophylaxis against malaria ;
— to determine the blood group ;
— to do some routine screening tests and a general examination ;
— last but not least, to discuss questions of hygiene, diet and breast-feeding, and to begin an exchange of views on whatever may worry a pregnant woman.

### 3. THE SECOND TRIMESTER

When the 1st-trimester visit has been done completely, the second trimester visit (and until the 8th month) is simple, but just as systematic. It investigates :

— weight gain (about 1 kg per month) (see paragraph 3.2 and fig. 3) ;
— blood pressure and pulse ;
— any oedema ;
— uterine height ;
— foetal heart sounds starting at about 4 1/2 months, using Pinard's stethoscope (fig. 4) ;
— the foetal movements starting at 4 months or 5 moons ;
— the cervix ;
— the colour of the mucosa.

This visit provides an opportunity to pursue the exchange begun at the previous visits, so as to assess the difficulties encountered by each woman. All of the major pathology of pregnancy may be detected (and therefore treated) during this visit.

3.1. **High blood pressure** : this means that the normal figures for blood pressure in the population group must be known. In West Africa, for example, blood pressure tends to be lower than in Europe. The highest acceptable figure is not 14/9, but 12/8. If the figure is high, a second measurement is made after one half hour spent lying down. We may be reassured if it returns to normal, but the woman's living conditions must be discussed with her (work at home and outside, family responsibilities, strenuous physical effort), along with the ways of organizing long periods of rest (1). If the husband is present at the consultation the discussion may take place in his presence, and this improves the chances of being heard. However, the woman will be told to have her blood pressure checked regularly.

(1) It should be emphasized that rest, apparently the simplest of treatments, often sufficient in itself, may be impossible to attain, given the indispensable role of the woman in the family economy. If rest, or at least a sufficient decrease in activity seems to be impossible, we must then prescribe ambulatory medication.

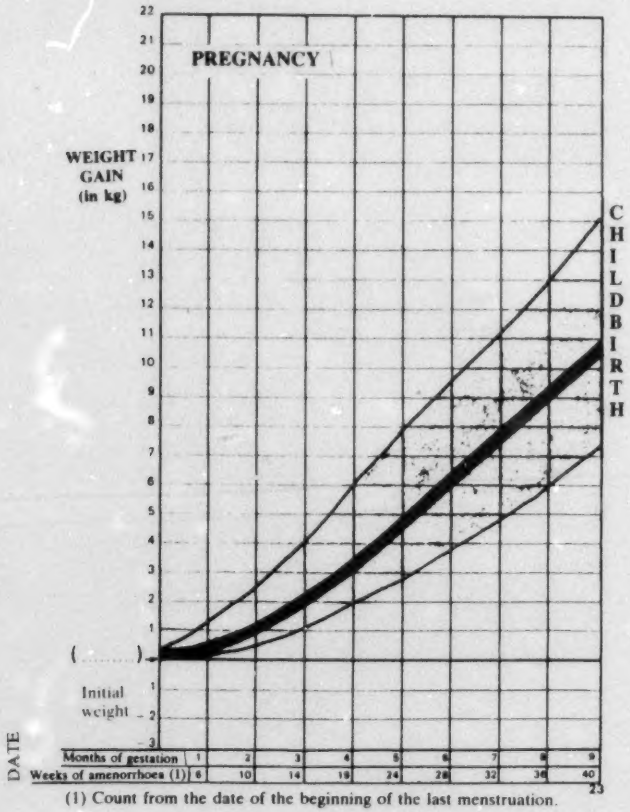


**Figure 3 : weight curve**

**Figure 4 : Pinard's stethoscope**

Source : J.C. CAZENAVE, Ph. BARNAUD. Dépistage des grossesses à risques outre-mer. In Soins, Pathologie tropicale n° 47. Mai-juin 1984.

When blood pressure is high, even moderately so, two other elements should always be checked : the existence of oedema and of albuminuria (1). These are a cause for concern : they are indications of renal suffering and of a hydro-electric imbalance, and along with high blood pressure they form the three signs of the pre-eclampsic syndrome (see paragraph 4.4.1.). When high blood pressure persists at rest it must be treated without waiting for one or the other of these two signs to appear, particularly when it occurs early in pregnancy (2).

3.2. **Excessive weight gain** : the ideal weight gain during pregnancy seems to be between 9 and 12 kg. By studying the weight gained between two visits, we may determine :

— **a sudden, rapid gain in weight**, to which great attention should be paid since it is usually due to the development of oedemas. When combined with high blood pressure we are faced with a pre-eclampsic syndrome (see paragraph 3.1.), requiring that the mother be treated, often in a maternity unit (strict rest, antihypertensive drugs) and foetal surveillance increased (foetal heart sounds, uterine height) ;

— **a continuous, excessive weight gain** is suggestive of an imbalance in the metabolism of sugars, which is confirmed by positive glycosuria and a disturbed glycaemic cycle (fasting glycaemia of 1 g/l or more, post-prandial glycaemia of 1.30 g/l or more, and glycaemia long after a meal containing 50 g of glucose, 1.30 g/l or more). Uterine height may be too great for gestational age, indicating foetal macrosomia (excessive foetal weight). A hypoglycaemic diet, never below 1,800 kcal/day, should be prescribed and it should be recalled that hypoglycaemic sulfonamides are contra-indicated in pregnant women.

3.3. **Stagnation of the uterine height** is a sign of slowed foetal growth, caused by many factors, usually interrelated. If we are to decrease the disease rate and the neonatal death rate we must achieve early detection of retarded growth, for small-for-date babies are known to be more fragile. The main causes to be sought are :

- placental insufficiency : high blood pressure, pregnancy in an adolescent, or in a woman who has borne many children. The best response is rest, which increases placental perfusion, and a satisfactory diet, when these are possible ;
- urinary infection, often silent (UCB) ;
- parasitoses : malaria, for which prophylaxis during pregnancy must be routine in malaria-infested areas ; bilharziasis may often be avoided by strict observance of hygiene, and which may be treated during pregnancy, like amoebiasis and ancylostomiasis (as opposed to trypanosomiasis, which cannot be treated during pregnancy) ;
- malnutrition (see Appendix 1).

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(1) Attention : albuminuria is also encountered in urinary infections.

(2) The epidemiology of gravidic high blood pressure : the reasons for which a pregnant woman may have high blood pressure are not yet clearly understood. It may be said, at present, that uteroplacental ischemia is always present, caused, perhaps, by poor adjustment of the uteroplacental arteries to the new balances involved in pregnancy (the need for a considerable increase in blood flow coming from the uterine arteries).

In Europe, epidemiology shows that the risk of high blood pressure is higher in primiparas, to a lesser degree in women who have borne many children and those with a family history of high blood pressure, in multiple pregnancies, diabetes, obesity, at the extreme ages (adolescents under 17 and older women above 40), in case of poor socio-economic conditions. The latter factor is probably the most important one in the developing countries.

The treatment of high blood pressure will be studied in appendix 3.

3.4. **A change in the cervix** (shortening and/or opening) : the study of the cervix and of its changes during the second and third trimesters is a major element in the prevention of premature delivery.

The vaginal examination must be an integral part of the prenatal consultation, especially when the woman is at risk of premature delivery and when uterine contractions are observed. It should always be performed aseptically, with a rubber glove or after very careful washing and brushing of the hands, with soap.

The way of life, malaria and infections contribute to the high frequency of premature births, particularly in adolescents and women who have borne many children, women with a malformed uterus or an incompetent cervix (1). Last, cervical modifications are occasionally caused by overstretching of the uterus during twin pregnancy or in case of excessive amniotic fluid.

The therapeutic attitude should be adapted to each case :

- local anti-infectious or anti-parasitic (trichomonas) drugs in case of vaginal infection ;
- systemic antibiotic in case of urinary infection ;
- rest and beta-mimetic drugs (Salbutamol$^{R}$, Ventoline$^{R}$) (2) to obtain complete relaxation of the uterus.

3.5. **Uterine height too great for theoretical term** is suggestive of :

- **an error in calculation of the term** : pregnancy more advanced than indicated by the date of the last menstrual period. The date of occurrence of foetal movements may then be used ;
- **multiple pregnancy**, which is a reason for special surveillance, since it often produces hypotrophy and prematurity, as well as complications (high blood pressure and venous disorders, etc.) ;
- **foetal macrosomia**, in which a sugar imbalance should be systematically suspected ;
- **excessive amniotic fluid**, usually connected with a foetal malformation.

3.6. **Anaemia** : it is particularly frequent during pregnancy and the puerperium, and is detected clinically during the prenatal visit by examining the conjunctiva, which are found to be pale. In addition, the woman may complain of great fatigue, dizziness, dazzled states, palpitations or shortness of breath. A blood test shows that the haemoglobin level has dropped below 11 g/l (the normal level outside of pregnancy is 12 g/l).

Anaemia in pregnant women is usually intricate, caused by both nutritional factors and parasitoses. As we shall see in Appendix 1, iron requirements rise considerably during a normal pregnancy. **Iron-deficient anaemia** is therefore extremely frequent in countries where women have insufficient reserves, even outside of pregnancy. This is linked with insufficient consumption of iron-rich foods, chronic digestive ailments, bilharziasis, malaria (see paragraph 3.8.), ancylostomiasis, trichiuriasis, kala-azar.

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(1) Incompetent cervix : pathological non-closing of the cervical canal. The diagnosis is based on hysterography and/or cervical calibration (normally, it should not accept a n° 9 Hegars bougie) before pregnancy. It is often linked with a uterine malformation and occasionally explained by a cervical trauma during childbirth. When observed early in pregnancy it may require cerclage of the cervix in a specialized centre.

---

(1) See Appendix 3.

Pregnancies at short intervals or multiple pregnancies are a non-negligible contributive factor, since the woman does not have time enough to reconstitute her reserves between two pregnancies. However, iron-deficient anaemia is often interrelated with megaloblastic anaemia due to **folic acid deficiency** (1), especially toward the end of pregnancy. The frequency and severity of anaemia during pregnancy and breast-feeding is certainly a cause of excess female mortality in some countries (2).

We will discuss the prevention of iron-deficient anaemia. Folic acid deficiency is more difficult to prevent, since it involves a change in dietary habits (food is overcooked, resulting in a loss of folic acid). It is treated by the administration of 10 to 20 mg/day of folic acid, taken orally.

---

(1) Folic acid deficiency : seen by studying red blood cells, which are of varying sizes (anisocytosis), mostly large (macrocytosis) ; the erythrocyte and haemoglobin count is low ; blood smear (hypersegmentation of the nucleus of the polymorphonuclear cells) ; (megaloblastic bone marrow ; folic acid level below 3 nanogrammes/ml serum).

(2) Henri DUPIN, Anne-Marie RAIMBAULT. Les troubles nutritionnels chez la mère et l'enfant. Epidémiologie et prévention. Editions Saint-Paul. Paris. 1978.

Cf. issue 133 of this journal, devoted to nutritional anaemia.

**Table of pathology seen consultation**

| Clinical signs | Possible causes | Tests | Effects on Fœtus | Prevention |
|---|---|---|---|---|
| Stagnating uterine height | High blood pressure | Albuminuria Uric acid | Hypotrophy Intrauterine death | Rest ± Anti-hypertensors |
| | Pregnant adolescent | | Hypotrophy | Rest |
| | Woman having borne many children | | Hypotrophy | Rest |
| | Parasitoses | parasites in blood and faeces | Hypotrophy | See table |
| | Malnutrition | | Hypotrophy | Education Supplementation |
| Change in cervix | Vaginal infection Vaginal parasitosis | Vaginal bacteriology and paris-tology | Vaginal Prematurity ± Hypotrophy | Local treatment |
| | Urinary infection | UCB | Prematurity ± Hypotrophy | Antibiotics |
| | Twin pregnancy Pregnant adolescent Pregnancy in multipara | | Prematurity ± Hypotrophy | Rest Beta-mimetics Education Planned parenthood |
| High blood pressure ± oedema ± weight gain | | Albuminuria Uric acid | Hypotrophy Intrauterine death | Rest Anti-hypertensors |
| Excessive uterine height | Twin pregnancy | | Prematurity | Rest Beta-mimetics |
| | Excessive amnio-tic fluid | X-ray | | |
| | Large foetus | Glycaemia Glycosuria | Foetal suffe-ring, intra-uterine death | Diet, treatment of diabetes |
| Anaemia | Iron deficiency : parasitoses | Parasites in blood and faeces | Hypotrophy | See table |
| | Iron deficiency : malnutrition | | Hypotrophy | Education Supplementation |
| | Folic acid deficiency : sickle celles diseases | Study of haemoglobin | Hypotrophy | Folic acid |

To complete this study, here are some specific reminders on :

— parasitoses and pregnancy (see table 3.7.) ;
— malaria and pregnancy ;
— tuberculosis and pregnancy.

3.8. Malaria and pregnancy

Frequency in Africa : between 15 and 44 % depending on the region.
Intensity is at a peak during the rainy season.

It mostly affects socio-economically underprivileged women in rural and suburban areas.

Pregnancy reactivates malaria, particularly during the 2nd trimester.

Major biological damage (destruction of erythrocytes, causing anaemia) and histological damage (contamination of the placenta) occur during the 3rd trimester.

The effects on the foetus : miscarriage, intrauterine death, premature birth, congenital malaria (quite rare, since maternal IgG cross over).

Effects on the mother : she gives birth is an anaemic, weakened state, with increased risk of dynamic dystocia (abnormal uterine contractions and dilatation), very poorly tolerated by the foetus when it is already ill (premature, hypoxic, malaria-ridden). At worst, maternal death may occur when the delivery takes place during a bout of malaria.

Puerperium : decreased lochia, decreased amount of milk, weakness, increase in infections.

The clinical picture is generally classic : a bout of malaria combining fever, headaches, aching all over, digestive disorders and conjunctival subicterus.

Congenital malaria : birth of a child with haematozoans, feeble, hypotrophic with signs of neonatal suffering.

**All pregnant women in endemic areas should have access to ongoing prophylactic treatment (1).**

**Any bout of malaria in a pregnant woman should be treated actively and rapidly :**

— Chloroquine (Nivaquine$^{R}$) = 1,500 mg orally divided doses over 3 days ; in case of vomiting, in IM or subcutaneous injectable form (10 mg/kg in two daily injections for 3 days) ;
— Injectable quinine salts (Quiniform$^{R}$ 1 to 2 g/day for 3 days ; Quinimax$^{R}$ 25 mg/kg/day in 2 doses for 3 days).
NB : chloroquine and quinine salts are not to be associated. After this treatment of the bout of malaria, it is preferable to continue routine prophylactic treatment until the end of the pregnancy. When in association with anaemia, a transfusion of fresh blood may be preferable.

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(1) A reminder of antimalarial chemoprophylaxis : Chloroquine (Nivaquine$^{R}$) 100 mg (1 pill) 6 days out of 7 or 3 pills (300 mg each) twice a week ; Amodiaquin (Flavoquin$^{R}$ 200 mg orally = 1 pill 4 times a week or Camoquine$^{R}$ 600 mg = 1 pill a week).

### 3.7. Parasitoses and pregnancy

**SUMMARY OF THE MAIN PARASITIC AILMENTS OBSERVED**

| DISEASE | EFFECT OF PREGNANCY ON THE DISEASE | EFFECT OF THE DISEASE ON THE COURSE OF PREGNANCY | EFFECT ON THE EMBRYO AND ON THE NEONATE | REMARKS |
|---|---|---|---|---|
| MALARIA | - Bouts during childbirth<br>- Decreased immunological defenses | - Premature delivery<br>- **Anaemia**<br>- **Fatigue** | - Congenital malaria<br>- Hypotrophy | Prophylaxis and treatment same as ordinary<br>Not abortive |
| TOXOPLASMOSIS | None - usually asymptomatic | **Abortion** | - Intrauterine death<br>- Hydrocephalus<br>- Microcephalus<br>- Late chorioretinitis (childhood and adolescence) | Non-immunized women : sero-diagnosis every 6 weeks throughout pregnancy<br>Hygiene |
| BILHARZIASIS | Decreased defense | - **Anaemia**<br>- Abortion<br>- **Extra-uterine pregnancy**<br>- Premature delivery | - Foetal hypotrophy | Treatment under surveillance during pregnancy |
| TRYPANOSOMIA – SIS | Immuno-depression | - **Hydramnios**<br>- **Abortion**<br>- Premature delivery | - Congenital disease<br>- Hypotrophy | **No treatment during pregnancy** |
| AMOEBIASIS | Immuno-depression at term (peak risk) | - Abortion<br>- Premature delivery<br>- **Colic necrosis in postpartum** | - Hypotrophy | Treatment possible<br>Hygiene<br>Post partal surveillance |
| ANCYLOSTOMIA – SIS | None | - Anaemia | - Foetal hypotrophy | Treatment possible + iron<br>Hygiene |
| TRICHOMONASIS | Worstened during 2nd and 3rd trimesters | - Premature delivery favoured by association with microbial infections | - None except prematurity | **Local treatment** |

Source : Soins, Pathologie Tropicale n° 47 - Mai-juin 1984

**A pernicious attack requires emergency treatment** with injections : Chloroquine IV 400 mg in 500 cc IG or quinine salts, 25 mg/kg ; treatment of the shock (corticosteroids), anticonvulsives (valium), transfusion of fresh blood and sloping position.

**Obstetrical complications :**

— If the woman is not in labour : antipyretics (since fever causes uterine contractions) and tocolytics (1) in case of uterine contractions. If the heart sounds are modified, a caesarean section should be envisioned ;
— if the woman is in labour, the latter will usually terminate very rapidly ;
— at birth, care must be taken not to injure the foetus (there is a risk of contamination) or to empty the umbilical cord (haematozoans tend to accumulate in the placenta, and may then massively contaminate the foetus). A parasitological analysis must then be performed : take a specimen of the cord blood, make a placental smear, a thick drop of the neonate, watch the neonate closely, especially for fever.

3.9. Tuberculosis and pregnancy

All health agents must of course be able to envision pulmonary tuberculosis when faced with a woman with a chronic cough, especially if other members of the family have the same symptom and if the woman's general health is impaired (weakness, loss of weight, etc.).

The treatment of tuberculosis will not be discussed here : it should be done in specialized centres, where appropriate medication will be administered in accordance with the phase of the disease, any drug resistance and the cost of the drugs. This involves a whole strategy, to be established on a community scale, and tuberculosis is not susceptible of individual, uncoordinated treatment.

Workers should nonetheless know :

— that a chest x-ray should be requested ;
— that a blood count should be requested ;
— that a bacteriological examination of sputa should be requested, to obtain proof of tuberculosis ;
— how to hasten the termination of labour (using forceps) in a woman with respiratory insufficiency ;
— that the Kock bacillus does not cross the placenta and that the neonate is therefore uncontaminated at birth ;
— that it is not desirable, and in fact is often harmful, to separate the baby from the mother. He/she should therefore be given preventive treatment against tuberculosis (isoniazid, 15 mg/kg) ; PAS is contra-indicated in children ;
— that breast-feeding can hardly be avoided, although this would be preferable when the woman's bacilloscopies are positive or too recently negative.

**4. THE THIRD TRIMESTER**

Surveillance of the pregnancy must be continued, following the same pattern for visits. In addition, however, a **prognosis** must be established **for childbirth**, through the study of the foetus, the cervix, the lower segment and the mother's pelvis. We will study the prevention of third trimester pathology after this.

---

(1) Appendix 3.

**The prognosis for childbirth**

4.1. The foetus

Its growth is always evaluated by the measurement of the uterine height, which increases by about 4 cm per month during the 7th and 8th months and by about 2 cm during the 9th month (26-28 cm at 7 months, 29-31 cm at 8 months, 31-33 cm at term) (fig. 2A and 2B).

Its position is determined by abdominal palpation, using the soft cushion of the fingers and the palm of the hands. The fingers determine the cephalic pole, the hardest tissue, the neck furrow, the flat of the back with the limbs on the opposite side (often the woman herself will indicate the side on which most foetal movements occur : this locates the limbs).

Palpation is thus the means of detecting a **cephalic presentation** (head downward), a **breech** (head upward), a **transverse presentation** (head in the left or right hypochondrium) (fig. 5).

**Figure 5 : abdominal palpation**

Source : Développement et santé n° 44. 1983. p. 24.

The presentation will be confirmed by vaginal examination : perception of the cephalic pole or of the breech (frank breech, the lower limbs are extended along the anterior side of the foetus), the feet (complete breech), or lack of any foetal pole in transverse presentations.

4.2. The cervix and the lower segment

The vaginal examination studies cervical modifications (fig. 5 bis) ; the latter becomes soft (ripens), permeable to the examining finger and decreases in length, in varying manners which depend upon parity (fig. 6).

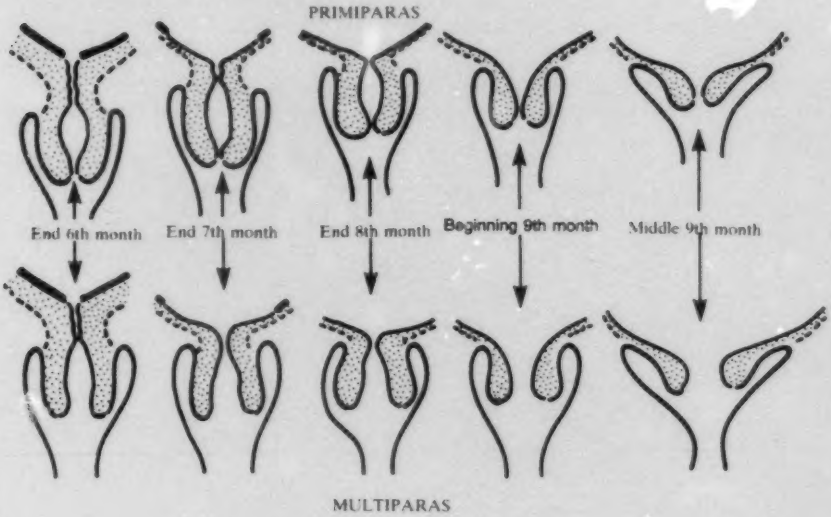


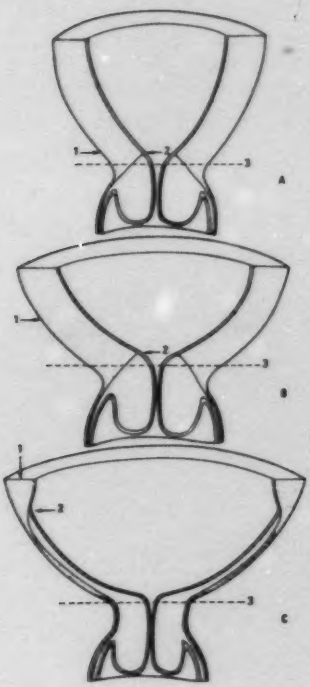

**Figure 5 bis : cervical modifications during the 3rd trimester**

Sources : Y. MALINAS. La consultation prénatale et le médecin praticien. Le concours médical n° 47 (supplément). 26.12.1981.

In addition, the formation of the lower segment (1) is studied ; its condition will be a decisive factor in uterine dynamics during labour.

---

(1) The lower segment : this name is given to the lower part of the uterine body at the end of pregnancy. It is formed out of the uterine isthmus and the superior part of the cervix. It is very thin, contains few muscle fibres and plays a role in transmitting the forces of uterine contraction to the cervix. It is therefore essential to cervical dilatation that it be well constituted. In caesarean sections, uterine incision is performed there, since it is poorly vascularized (fig. 6).




A = non-gravid interna
B = gravid uterus, first 5 months
C = gravid uterus after 5 months of gestation
1 = line of "solid peritoneal adhesion"
2 = anatomic entrance
3 = histological entrance

**Figure 6 : forming of the lower segment**

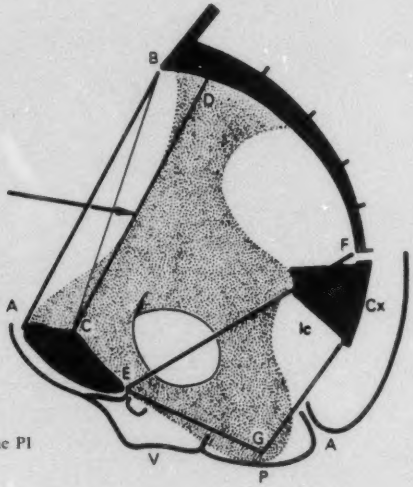
Source : In Tournaire. Physiologie de la grossesse. p. 226. Maloine. Paris. 1982.

4.3. The pelvis

We have discussed the foetus (size, presentation) and the uterus which contains it (cervix, lower segment, amniotic fluid). It is of course most important, next, to study the mother's pelvis, since the foetus must cross it at birth. The state of the pelvis during the 3rd trimester is therefore a major element in the prognosis of childbirth. An advance decision regarding the management of childbirth is conditioned by what we learn about it, and many accidents in which the child's life is threatened and sometimes the mother's life as well, may be avoided by studying it.

Examination of the pelvis enables us to distinguish between those women who may give birth in a rural centre from those who require transferral to a more specialized centre. It must be remembered that trial labour (1) with an apparently borderline pelvis can only be attempted in a maternity unit equipped with a surgical block.

The clinical examination of the pelvis should be mastered by all midwives and physicians. It requires some anatomical knowledge (fig. 6 bis), involves some simple rules and requires sufficient experience. When done properly it is usually sufficient, and only in "borderline" cases is radiopelvimetry (2) needed.




AB : superior anatomical diameter
CD : anteroposterior obstetrical diameter of the PI
EF : anteroposterior diameter of the PO
V : vulva
P : perineum
A : anus

**Figure 6 bis : the pelvic diameters**

Source : Y. MALINAS, M. FAVIER. ABC de mécanique obstétricale. Masson. Paris, 1979.

**The pelvic examination**

It begins with a study of the woman's **height** (take heed if she measures less than 1.60 m), how she **walks** (does she limp ?), her **spinal column** (scoliosis cyphosis). Indeed, shortness, uneven lower limbs or a deviated spinal column are often linked with

(1) Trial labour : when a cephalo-pelvic confrontation is attempted for a pelvis considered "borderline", while uterine mobility (contraction), the adaptation of the presenting part, its engagement and progression in the cavity are judged. The natural forces are allowed to act in a context in which the child may be extracted unharmed if the trial is a failure.

(2) The radiological study of the pelvis, for the measurement of the different diameters.

a morphological pelvic anomaly. The woman will then be placed in the gynaecological position, with her fists under her buttocks.

**Clinical measurement of the pelvic inlet** (PI)

The two-finger vaginal examination is done with the index and the middle finger, held in the same axis as the forearm, which is horizontal (that is, parallel to the table top). Normally, the fingertips do not reach the promontory. The **antero posterior (conjugate) diameter** is then about 12 cm (fig. 7).

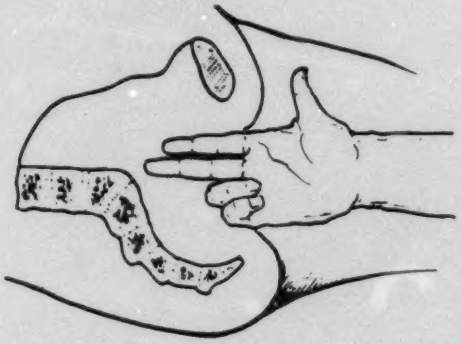


**Figure 7 : anteroposterior diameter**

Source : J.C. CAZENAVE, Ph. BARNAUD. Dépistage des grossesses à risques outre-mer. In soins, Pathologie tropicale n° 47. Mai-juin 1984.

The transverse diameter of the pelvic inlet is assessed by the measurement of the base of the **prepubic triangle** : the distance between the two inguinal folds of the upper edge of the pubis is normally 12 cm (fig. 8). Distortions in **Michaelis' rhomboid** are always present in asymetric pelvic inlets (fig. 9).

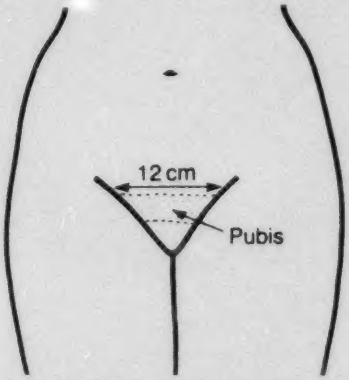
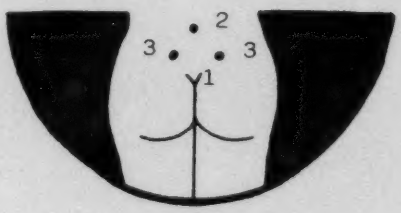



**Figure 8 : prepubic triangle**




1 : anal cleft
2 : spinal apophysis of L5
3 : anteroposterior iliac spine

**Figure 9 : Michaelis' rhomboid**

**Assessment of the pelvic cavity** (between the pelvic inlet and the pelvic outlet).

This is also done by the two-finger examination, which judges the sacral concavity - normally, the tip of the middle finger can only touch the lower margin of the sacrum (S5) (while the index finger remains in position under the pubis). The larger the portion of the anterior face of the sacrum which is felt, the more the anteroposterior diameter decreases in its lower portion (funnel-shaped pelvis ; the PI is satisfactory but the lower diameters are decreased) (fig. 10).

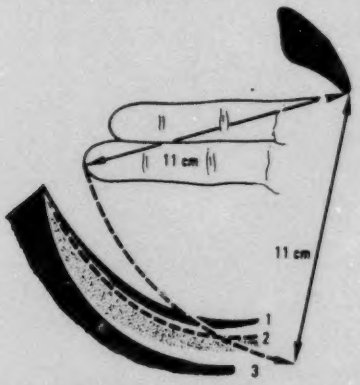



**Figure 10 : assessment of the pelvic cavity**

Source : Y. MALINAS, M. FAVIER. ABC de mécanique obstétricale. Masson. Paris. 1979.

**Assessment of the pelvic outlet** (PO)

The vaginal examination indicates the saliency of the ischial tuberosities, and therefore the **transverse biischial diameter** : 10 cm.

The external measurement of the transverse diameter of the pelvic outlet is performed by placing the closed fist between the two ischia. The diameter is then less than 9 cm. If there is not room enough between the two ischia for a fist, this is evidence of a transverse shortening of the pelvic outlet (fig. 11).

**Figure 11 : external measurement of the transverse diameter of the inferior orifice of the pelvis**

Source : J.C. CAZENAVE, Ph. BARNAUD. Dépistage des grossesses à risques outre-mer. In soins, Pathologie tropicale n° 47. Mai-juin 1984.

**Clinical assessment of a soft pelvis**

Last, the vaginal examination serves to assess the muscle tone of the pelvic outlet (levator ani and the perineal fascia, between the vulva and the anus) and to detect any cicatricial damage.

Many pathological conditions may cause deformity in the pelvis, producing a generally small pelvis (rickets), an asymetric pelvis (congenital dislocation of the hip, pelvic fracture), a funnel-shaped pelvis (Pott's disease). Prolonged malnutrition may modify the dimensions of the pelvis, thus causing difficulties in women who had given birth "well" until then.

Pelvic examination should be a routine practice before childbirth, and any abnormal measurement should be followed by a pelvigraphy and, when possible, by the echographic measurement of the biparietal diameter of the foetal head. The comparison of these two examinations will provide a foolproof indication of whether the delivery may take place through the birth canal or whether the foetus must be extracted by caesarean section at term, before the onset of labour.

In short, the **external clinical examination** makes it possible :

— to suspect an anomaly by studying the woman's height, how she walks and her spinal column ;
— to assess the transverse diameter of the PI (the base of the prepubic triangle) ;
— to detect an asymetric PI by studying Michaelis' rhomboid ;
— to measure the biischial diameter (the transverse diameter of the PO).

The **vaginal examination** makes it possible :

— to measure the promontary-pubic distance (the anteroposterior diameter of the PI) ;
— to assess the cavity between the PI and the PO ;
— to assess the anteroposterior diameter of the PO and the transverse diameter of the PO (interischial diameter) ;
— to detect a soft pelvis.

4.4. Accidents during the third trimester and their prevention

Some accidents may occur during the third trimester ; although they may not always be prevented, their effects on the mother and the foetus will be decreased by proper surveillance.

4.4.1. Eclampsia and retroplacental haematoma

These two ailments may be grouped together, for they both occur in conjunction with gravidic hypertension and require the same surveillance. **Prevention = detection, surveillance and treatment of all cases of high blood pressure during pregnancy** (see paragraph 3.1.), with the knowledge that such prevention is less effective in case of retroplacental haematoma than for eclampsia.

The **pre-eclamptic syndrome** is defined by the combination of high blood pressure resistant to treatment, oedema (or sudden weight gain) and albuminuria. It causes foetal suffering. It requires the emergency evacuation of the mother so as to extract the foetus by caesarean section. The outcome, often fatal for the child, may also be fatal for the mother if the uterus is not emptied before the **eclamptic** seizure occurs (the picture is the same as for epilepsy, except for the emission of urine and biting of the tongue).

**Suggested individual record card for prenatal visits**

- Surname, given name, age, address
- Blood group,
- Weight (before pregnancy)
- Height (above or below 1.50 m)
- Number of children (living and dead) = parity
- Number of miscarriages or abortions = pregnancies
  (example : 2 live children, 1 dead child, 1 miscarriage = Para four, five pregnancies)
- History = course of previous pregnancies and deliveries, surgical operations (scars)
- Antitetanus vaccination (date)

Additional pathology = malnutrition, anaemia, malaria, etc.

Pelvic examination

- N° and date of the consultation
- Term (in months, weeks, moons)
- Weight (weight gain in kg with respect to weight before pregnancy ; normal gain = approximately 1 kg per month)
- Uterine volume (during 1st trimester) or uterine height (2nd and 3rd trimesters) = proper for term, improper for term
- Foetal heart sounds
- Foetal movements
- Cervix (length, location, opening)
- Blood pressure
- Other signs : fever, anaemia, urinary burning, bleeding, etc.
  Tests requested (check those requested) : UCB, Blood count, Blood group, thick drop, chest x-ray, etc.

**Conclusions and treatment, if any**

**Retroplacental haematoma** (seen in about 8 out of 1,000 pregnancies in Africa), also called **premature detachment** (or abruption) **of the normally implanted placenta**, which definition represents a good description of the facts, should immediately be suspected in all women with high blood pressure and a hypertonic uterus (contracted uterus or stift uterus) with or without vulvar bleeding. Immediate, artificial rupture of the membranes usually results in rapid expulsion of the foetus. If not, caesarean section must be performed.

4.4.2. Placenta praevia

This is impossible to prevent. Instead of being implanted on the fundus of the uterus, or on the sides of the uterine body, the placenta covers a variable surface of the lower uterine segment.

The slightest change in the cervix then produces slight detachment of the placenta and, consequently, vulvar bleeding. Any haemorrhage, however slight, before the onset of labour, with red blood, no pain or uterine contraction and no high blood pressure is indicative of this disorder, and particularly when it occurs repeatedly. The woman should benefit from emergency transferral to a centre where surveillance is available and where a caesarean section may be performed.

**At the beginning of labour**, a placenta praevia covering the cervix may be diagnosed by vaginal examination, when there is a feeling that a "placental mattress" separates the cervix from the presenting part. Caesarean section is the only alternative before the haemorrhage increases.

**During labour** and when the placenta only covers the cervix partially, the membranes must be ruptured and the presenting part pressed against the cervix in an attempt to stop the bleeding by compression and to hasten the progress of labour.

4.4.3. Premature rupture of the membranes

This is a rupture of the bag of membranes before the onset of labour. It is not serious if it occurs at a date close to the term, since labour generally begins shortly thereafter. It is much more serious when it occurs long before the term, since it causes the child to be born prematurely. In addition, the rupture of the bag of membranes places the foetus in direct contact with the external environment, and exposes it to the risk of infection. Premature rupture requires surveillance of the mother's temperature, of the colour of the amniotic fluid and of the foetal status (FHS).

The **management** of premature rupture may be summarized as follows :

— **before 34 weeks** (7 1/2 months), the risk of prematurity is greater than the risk of infection, and we must attempt to gain a few weeks : **hospitalization**, surveillance of the mother's temperature, repeated bacteriological testing of the amniotic fluid, surveillance of the foetal status ;
— **after 34 weeks**, the risk of infection is greater than the risk of prematurity, and **artificial induction of labour** (1) should be the rule if labour has not begun spontaneously 24 or 48 hours after the rupture.

---

(1) Artificial induction of labour : this may be done in the mother's interest (heart disease, severe illness, intrauterine death without spontaneous expulsion), but cases are rare, or more often, in the interest of the child : severe gravidic hypertension, chronic foetal suffering (hypotrophy), premature rupture of the membranes, maternal diabetes, etc. It can only be done when the pelvis is satisfactory and in a cephalic presentation. It is contra-indicated in case of a scarred or fragile uterus (women who have borne many children, etc.). Induction may be mechanical (detachment of the membranes, intracervical ballooning) or medicinal (Sparteine, oxytocics : see Appendix 3).

Premature rupture of the membranes is therefore a most dangerous accident for the foetus, since it exposes it to the risk of prematurity (respiratory distress), possibly complicated by neonatal infection. The neonatal mortality rate is then alarming. Its

**prevention** requires :

— the detection and treatment of vaginal infections and parasitoses and of urinary infections during pregnancy ;
— the detection and treatment of any threat of premature delivery (TPD).

4.4.4. The threat of premature delivery

Every health team working with pregnant women should be constantly haunted by this risk. Noone should allow prospective situations to go unrecognized. Special surveillance is required for :

— women with a past history of premature delivery ;
— women with a past history of miscarriage, particularly if they underwent curettage with cervical dilatation ;
— women who bled early in pregnancy ;
— women with vaginal or urinary infections ;
— multiple pregnancies ;
— cases of hydramnios (excessive amniotic fluid) ;
— pregnancies complicated by placenta praevia (but we have seen that this cannot be detected at present) ;
— to a lesser extent, primiparas and women who have borne many children.

We must be aware, however, that the risk of premature delivery is always great in poor, ignorant women regardless of the country.

The **prevention** of this risk of premature delivery is therefore dependent upon the economic, educational and health efforts directed toward the most underprivileged population groups.

The **detection** of this threat requires routine prenatal visits, the surveillance of "at-risk" women and the understanding of the physiological and pathological changes occurring in the cervix during pregnancy (fig. 6).

The **treatment** of this threat of premature delivery requires that it be recognized at an early date, that a cause be identified and eliminated when possible (infection, for example), and the woman convinced of the need for strict rest in a reclining position and of the need for hospitalization so as to begin medicinal treatment with oxytocics (see Appendix 3).

4.4.5. Intrauterine death, or foetal death (FD)

We shall discuss this briefly, since it is a frequent occurrence in the developing countries, and should be combated by proper surveillance of pregnancies. It should also be watched for so as to prevent dramatic complications for the mother.

The **prevention** of FD involves the detection and treatment of infectious pathology in the course of pregnancy (toxoplasmosis, rubella, syphillis, listeriosis), as well as of high blood pressure (gravidic hypertension) and its complications, rhesus incompatibility, diabetes and premature rupture of the membranes.

It is difficult or impossible to eliminate some causes : the number of FD increases in multiple pregnancies, which require close surveillance with emphasis upon rest and

a healthy diet. FD may also be explained by a cord anomaly (a knot, etc.), a vascular or placental anomaly or a foetal malformation.

The **diagnosis** may be difficult and occurs at a late stage. It is based upon clinical signs : arrested foetal movements, absence of heart sounds, stagnation or decrease in UH, secretion of milk. FD may be confirmed by the x-raying of the uterine content, when this is possible.

The **spontaneous course** usually tends toward expulsion within 4 weeks. Patience is required, and the woman must be helped to tolerate a psychologically difficult situation. Haemostasis (all coagulation factors) must be kept under watch, for this is the dangerous point, and we must not wait until haemorrhage due to a drop in fibrinogen occurs. Induction is required when spontaneous expulsion does not occur or when a complication is feared : major detachment of the membranes (taking care not to rupture the bag of membranes too soon) and perfusion of oxytocics (see Appendix 3), given the fact that this is only effective if the cervix is "ripe".

# III. THE SURVEILLANCE OF LABOUR

Whether or not labour follows a proper course depends to a large extent on the normal development of the pregnancy. This is another indication of the tremendous importance of adequate surveillance, which results in the early detection and treatment of any anomaly which may be a disturbing factor during childbirth. A woman who has received proper surveillance, has confidence in the obstetrical team, whose past history is known, whose pelvis has been correctly examined and whose child has received proper surveillance - that is, a woman for whom all of the "risks" of childbirth have been assessed - will only exceptionally encounter "unaccountable" dangers which endanger her life or that of her child.

The surveillance of labour requires that the normal be distinguished from the pathological ; pathological labour tends to build up insidiously and gradually. Here too, it is important that examinations be done at regular intervals, that the results be recorded on an individual record card by a person who is perfectly familiar with the different phases of normal labour. Only such systematic checks enable us to act appropriately and in time, in case an anomaly occurs. A **partogramme** is therefore established in order to chart the surveillance of labour. The parameters used are the progression of dilatation in time, the progression of the foetal body with respect to the pelvis, the foetal status (heart sounds), maternal status (blood pressure, agitation, etc.).

## 1. THE ONSET OF LABOUR

This is defined by the beginning of uterine contractions (UC), painful and regularly spaced, along with changes in the cervix :

— effacement : disappearance of the contours of the cervix ;
— the beginning of dilatation, up to 3 cm.

In primiparas, labour usually begins with a long, closed cervix. It is gradually shortened, then is effaced, permeable to the finger and dilated up to 3 cm, and well centred.

In multiparas, labour often begins when the cervix is already shortened and the dilatation progresses along with the effacement of the cervix.

The first phase of labour, or "ypreparatory phase", varies in duration : it is generally short and clearcut in primiparas, longer in multiparas.

Uterine contractions are studied by placing one's hand flat down on the woman's abdomen. We may thus observe the **intensity** of the uterine contraction, its **duration**, the **relaxation** of the uterine muscle between two contractions, and last, the **frequency** of these uterine contractions.

The foetal status is judged by :

— listening closely to the foetal heart sounds ; these should not slow down during or after a contraction ;

— studying the colour of the amniotic fluid by amnioscopy : an amnioscope (1) is introduced through the cervix as soon as it is permeable, gently, so as not to rupture the membranes, and aseptically. This should be done routinely at the onset of labour, and the amniotic fluid should be clear.

It is still time to examine (or re-examine) the pelvis, the foetal volume and the presentation. **Some anomalies may already be observed** during this preparatory phase :

— **signs suggestive of foetal suffering :**
  • **the foetal heart sounds slow down** during contractions, and occasionally remain slow after the contraction. When this occurs at the onset of labour it is often quite unfavourable, since it is indicative of the foetus' inability to tolerate the contraction (an ill foetus with too small an oxygen reserve) ;
  • **a meconial amniotic fluid,** seen during amnioscopy, is particularly unfavourable when it is seen early in labour and is in conjunction with slower heart sounds. Suspicion of foetal suffering will of course influence the management of labour.
— **excessive amniotic fluid** may slow down the advancement of dilatation ;
— **too little amniotic fluid** (oligohydramnios) is more serious. The uterus is moulded around the foetus during the uterine contraction. Dilatation is slower and the risk of foetal suffering is greater ;
— **early rupture of the membranes**, occurring at the very beginning of labour and preventing the bag of membranes from acting on the cervix. This may lengthen the duration of dilatation ;
— **uterine contractions at excessively short intervals**, or poor relaxation of the uterus between contractions. This may be only a simple contractile anomaly which should nonetheless be treated since it may prevent dilatation and produce foetal suffering by stopping maternofoetal circulation (eliminate any oxytocics and/or antispasmodics) (2). It may also be the sign of placental abruption : the uterine hypertonia, usually extremely painful, may then be accompanied by haemorrhaging, occasionally minimal, and a change in foetal heart sounds (slowing down). We have seen that this condition occurs in women with high blood pressure and that emergency extraction of the foetus is required.

## 2. DILATATION

This is the second phase of labour. It is the result of the combined effects of uterine contractions and of the pressure of the bag of membranes on the cervix. It generally lasts 4 to 6 hours, and goes faster in multiparas than in primiparas. Its speed varies, with three clearly visible stages (fig. 12).

---

(1) Amnioscope : an instrument used to assess the colour of the amniotic fluid through the membranes, when the cervix is permeable. This must be done gently and with perfect asepsis. The best type of amnioscope, easy to use and to keep clean, is the plastic amnioscope (commercialized in France by Concorde Import Export, 20, rue Villiers, 92300 Levallois-Perret, Hauts-de-Seine, France).

(2) Appendix 3.

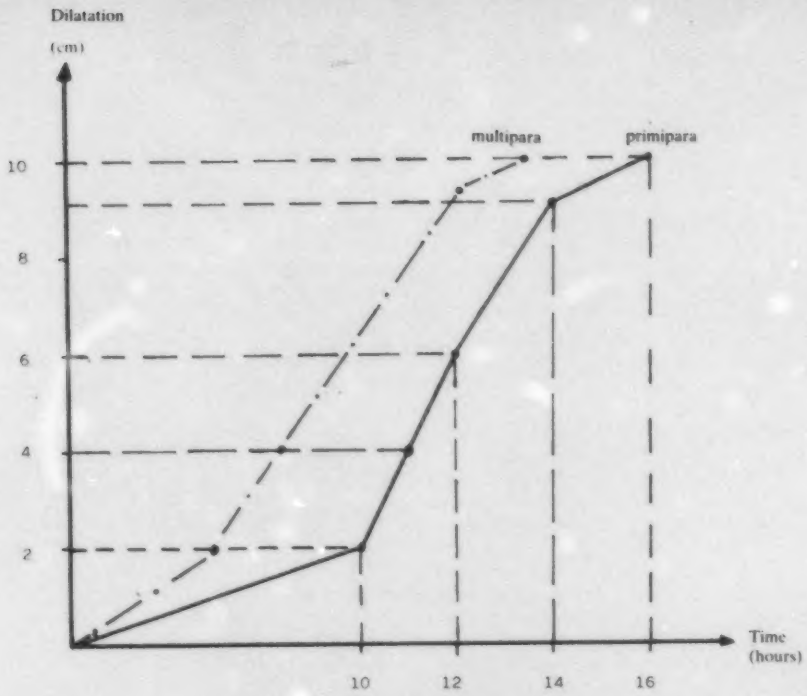



**Figure 12 : cervical dilatation**

The number of contractions is an important factor, since these affect placental circulation (1). When the duration of labour is normal, less than 100 to 120 contractions are needed and foetal morbidity and mortality are then very low. The **duration of labour** therefore greatly influences the foetal status, particularly in the case of prematures and/or small-for-date (hypotrophied) babies. **A clock of some sort is therefore**

(1) Review of uteroplacental circulation : the arterial blood arrives in the intervillous space (10 mm of mercury) with a pressure of 70 mm of mercury. In the latter, the placental villosities bathe in the maternal blood, and it is through the very thin walls of the villosity that the mother-foetus exchanges take place. The blood pressure in the villosity is only 30 mm of mercury. The maternal blood leaves the intervillous space through the veins, in which the pressure is only 10 mm of mercury.
During a normal uterine contraction the veins are compressed and the foetus disposes of the oxygen reserve contained in the intervillous space. When the oxygen reserves are low (maternal anaemia, high blood pressure, placental insufficiency), the foetus is already fragile (hypotrophied), and it will suffer from anoxia (lack of oxygen) during the uterine contraction. When the uterine contractions are too close together, there is not enough time for the oxygen reserve to be reconstituted, and the consequences for the foetus are the same. When the contractions are too strong, the uterine artery itself is compressed. This prevents the arrival of oxygen, with the same result. Foetal anoxia produces a reflex slowing of the foetal heartbeat.

**an absolutely indispensable object in a delivery room** and the time at which labour begun, the duration of dilatation, the duration of expulsion and of delivery of the placenta should all be very carefully inscribed on the record.

All of these elements will therefore be noted on the **partogramme** after each examination (fig. 14).

— intensity, duration and frequency of uterine contractions ;
— state of dilatation and flexibility of the cervix ;
— state of the bag of membranes ;
— situation of the presentation (mobile, arrested, engaged) ;
— foetal heart sounds ;
— blood pressure ;
— mother's state (calm, excited).

**The uterine contraction** : intensity, duration, frequency. These factors differentiate a regular pattern of contractions, which has a good prognosis, from the anomalies which will be studied below (inertia, hyperkinesia).

**State of the cervix** : the degree of dilatation and the flexibility of the cervix are studied by vaginal examination. Either the dilatation progresses regularly, or on the contrary, it stagnates, with a rigid cervix which seems to retract during contractions (see abnormal dilatation).

**The bag of membranes** : it is flat or slightly rounded during the uterine contraction, and contributes to dilatation by exerting pressure on the cervix. When rounded and pushing out through the cervix it is ineffective for dilatation and prevents the presenting part from acting on the cervix. The examination of the bag of membranes, therefore tells us when is the best time for its rupture : while early rupture of the membranes at the beginning of dilatation may be harmful, it may speed up dilatation at its advanced stages (above 6 cm). In addition, rupturing also makes it possible to check on the colour of the amniotic fluid. It should be remembered that it must always be performed in strict conformity with the rules of asepsis, during uterine contraction, using one blade of Kocher's forceps (or any other **sterile** instrument) and using the finger to control the flow of amniotic fluid so as to avoid prolapse of the cord (1).

**The presenting part** : its location should be judged with reference to the pelvic inlet (mobile, arrested, engaged) (fig. 13). Its orientation is determined by studying the position of the sagittal suture and its degree of flexion by studying the location of the occipital fontanel.

**The foetal heart sounds** are a major element in foetal surveillance. They must be checked during and **after** the contraction, especially in fragile babies (prematures, low weight, twins, etc.).

**The blood pressure** and the **mother's state** (calm, excited).

All of these elements in the surveillance of labour clearly show the value of the partagramme. Any anomaly connected either with the uterus or the foetus may easily be detected in time, so that we may act in consequence.

---

(1) Prolapse of the cord : crossing of the cervix by the umbilical cord. This accident is very serious since the cord will be crushed by the presenting part, causing an interruption of the blood circulation between the mother and the child, and consequently, foetal death. No attempt should be made to return the cord to the uterine cavity, but the presenting part should be held back to prevent compression of the cord until the child may be extracted by caeserean section.

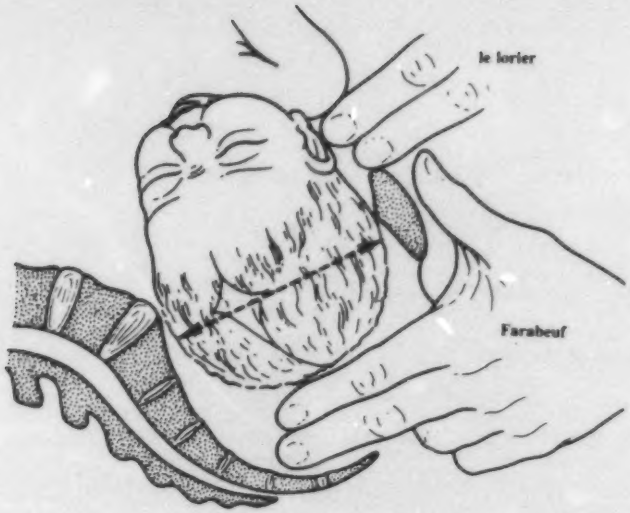



**Figure 13 : the engaged presentation**

Source : Y. MALINAS, M. FAVIER. ABC de mécanique obstétricale. Masson. Paris. 1979.

**Engagement of the crown**

The vertex presentation is engaged when the two extremities of its greatest diameter (biparietal diameter) have come out of the pelvic inlet.

Farabeuf's sign : the head is engaged when two fingers may just be lodged between the perineum and the presentation.

Le Lorier's sign : the head is engaged if two fingers cannot be placed between the anterior shoulder and the pubis.

It is important to diagnose foetal engagement, for it then arrives at the pelvic outlet and is already stretching the perineum. A head that has crossed the pelvic inlet cannot be stopped by the pelvic outlet, except in case of a funnel-shaped pelvis or when the head is deflected.

**Abnormal dilatation.** These are grossly divided into :

— **absence of contractions** : uterine inertia is frequent in women after many pregnancies. It is not serious for the foetus when it is not accompanied by retraction (moulded forceps). It justifies the use of Syntocinon$^{R}$ in perfusion, at as low a dose as possible (5 units in 500 cc ; begin with 5 drops/minute or 2 U in IM). Retraction requires caesarean section ;
— **effective uterine contraction but dilatation stopped before 6 cm** : the cervix is rigid and seems to be retracted during uterine contractions. This situation is generally corrected by antispasmodics (Appendix 3) ;
— **effective uterine contractions but dilatation stopped after 6 cm** : the absence of any mechanical obstacle must first be verified, after which anaesthesia with Nesdonal$^{R}$ (30 cg in slow IV injection) without intubation is required to ob-

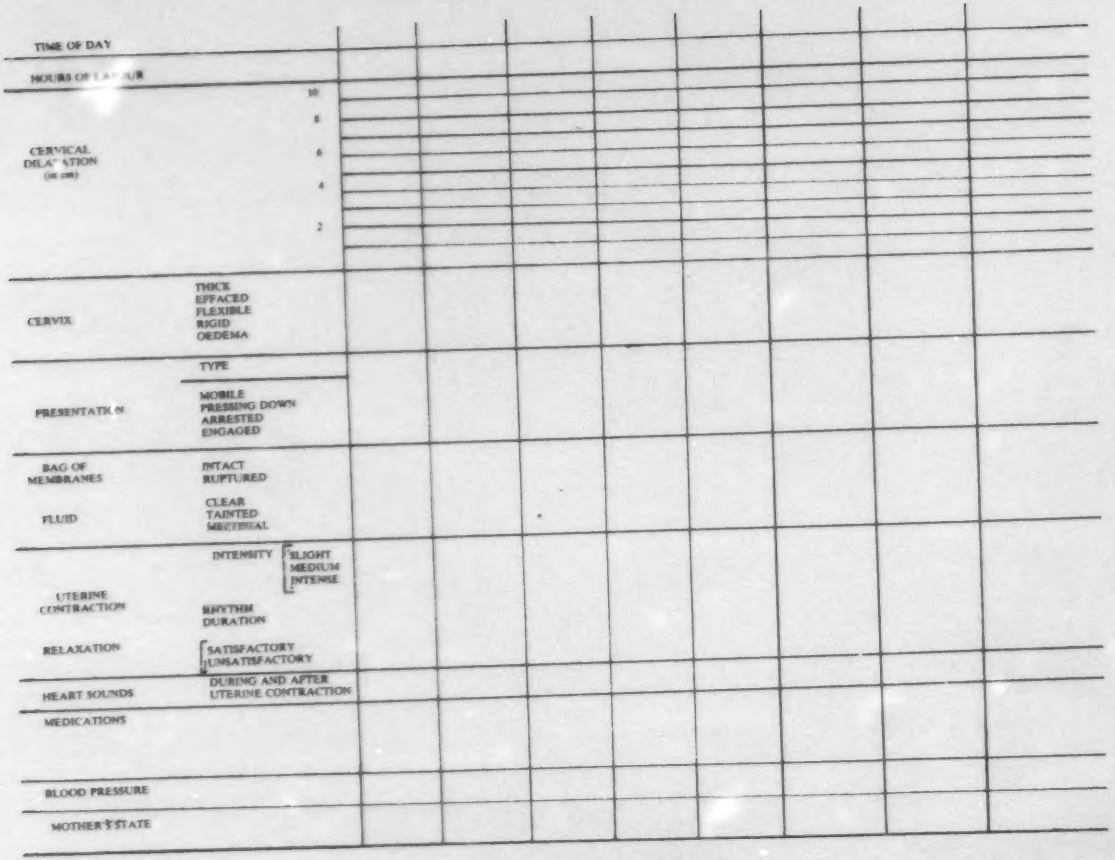



**Figure 14 : the partogramme**

tain the relaxation of the lower segment, along with the perfusion of an oxytocic in order to reinforce the uterine contractions. Dilatation is thus terminated rapidly and rapid expulsion obtained (with the help of a vacuum extractor or forceps, if needed).

— **contractions too intense and at too short intervals** : hyperkinesia and hypertonia may be caused by premature placental abruption (see accidents during the 3rd trimester), inappropriate use of oxytocics, which should then be decreased or stopped. However, they may also be a prelude to a uterine rupture. This is a dramatic event and we must know how to prevent it (see paragraph 5).

### 3. EXPULSION

Here again, the most reasonable attitude is generally to do nothing which might hinder the normal progression of childbirth. The preventive attitude involves providing the best possible medical and psychological comfort and the ability to detect any anomaly as soon as possible, thanks to sufficient familiarity with the normal progression of expulsion.

The delivery room should be a calm place in which noise and bright lighting are avoided whenever possible, and the number of persons present also limited. It should be remembered that fear and excitement always have a harmful effect on cervical dilatation and prevent the woman from cooperating during expulsion.

When dilatation reaches 9 cm the woman is placed in the obstetrical position, seated or lying on her back as she prefers, with her thighs in hyperflexion on her pelvis. The seated position does not hasten labour but it may facilitate satisfactory stretching of the perineum ; it is often less practical for the birth attendant. The woman should be asked to urinate before delivery, and if this is impossible, the introduction of a probe under satisfactory aseptic conditions should not be neglected.

Vaginal examination is practiced to follow the descent, rotation and flexion of the presenting part through the excavation and the pelvic outlet. The opportunity is taken to assess the state of the perineal tissues, their flexibility, the eventual existence of scars (due to laceration during previous deliveries), the ano-vulvar distance, which normally measures 3 cm (when it is too short the anal sphincter may be torn during expulsion : this should be prevented by an episiotomy) (fig. 15).

As during dilatation, we must take the time to help the woman to relax, thanks to appropriate breathing techniques between and during the contractions. It should be recalled that "panting" or "superficial" breathing often causes anxiety, and induces poor foetal and maternal oxygenation : it should never be prolonged. The woman should also be told how to facilitate expulsion, when the time comes, by "pushing". The woman should only be told to "push" when the presenting part approaches the perineum. If she pushes too soon this is quite ineffective, and may also produce a state of exhaustion, especially in multiparas, who may be anaemic and malnourished, in addition.

Surveillance of foetal heart sounds should be continued, with the knowledge that engagement may be accompanied by a temporary slowing.

**Uterine expression** (the pressure exerted on the fundus of the uterus by an assistant **during** the contraction) may hasten expulsion in case of a difficulty, but it may be harmful if it is too violent and/or too prolonged.

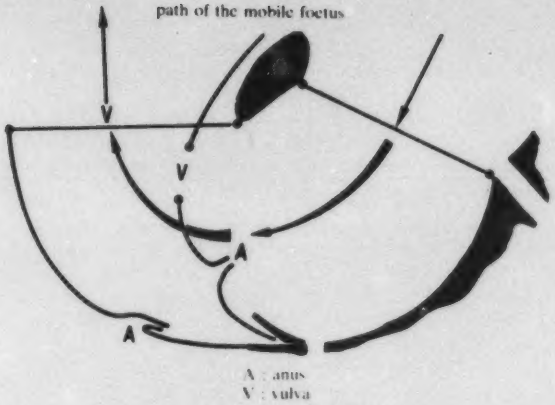



**Figure 15 : perineal stretching during expulsion**

Source : Y. MALINAS, M. FAVIER. ABC de mécanique obstétricale. Masson. Paris. 1979.

**Delivery** should be done extremely cautiously, avoiding any laceration of the perineum, whenever possible. Preventive episiotomy should only be performed when absolutely necessary and in any case should not be a routine practice.

The child is then placed on the mother's belly and its state assessed on the basis of its breathing, colour, crying, muscle tone and heartbeat (Apgar score). A gentle chest massage may help to eliminate the fluid contained in the baby's lungs, so that its first breath may come more easily. Similarly, its mouth may be wiped with a clean piece of linen. When the baby is well, the cord is only cut when it has stopped beating ; it should not be emptied when maternal malaria is suspected. The cord must be cut in a perfectly aseptic manner, using sterile scissors and holding it between two clamps.

If the baby's state is not satisfactory the two main things to do are to clear the lungs by nasal and buccal aspiration (vacuum pump) and to maintain proper heat. The child's weight at birth will be recorded, for subsequent surveillance.

Several millilitres of cord blood are taken in order to establish the child's blood group when the mother is rhesus negative (for the prevention of rhesus isoimmunization). Other tests may be performed on the cord blood, depending on the context (testing for malaria, toxoplasmosis, haemoculture if an infection is suspected, etc.).

**Special cases**

Care should be taken not to prolong expulsion in a woman with a **heart disease** (heart murmur, sequela of rheumatic fever) or **respiratory insufficiency** (tuberculosis). This means that the woman should only be encouraged to push at the last minute, when the head comes into contact with the perineum, and the expulsion should be aided by the use of a vacuum extractor or forceps.

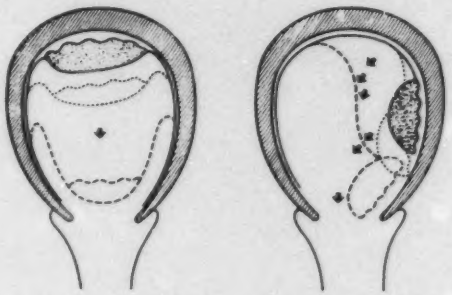
In **twin pregnancies** mechanical difficulties are rare, since the foetuses generally have a low birth weight. It is well known, however, that the second twin is more fragile and has a better prognosis when the time separating its birth from that of the first twin is very short (about 10 minutes). As soon as the first twin is born, then, its cord should be identified used clamps, the presentation of the second twin checked, the second membrane ruptured if it exists. The attendant must be capable of performing version and total extraction and must use oxytocics cautiously when the expulsion does not occur rapidly.

A foetus with a **low birth weight** (hypotrophied) is always more fragile, regardless of whether or not it is premature. Foetal suffering (stained amniotic fluid, slower heart sounds during and/or after uterine contraction) is therefore more frequent and requires the use of forceps to facilitate the expulsion (the vacuum extractor is an unsatisfactory instrument in prematurity, since the skull is insufficiently ossified). The prevention of hypotrophy and prematurity, both major causes of neonatal mortality and morbidity, must be one of the main objectives of the surveillance of pregnancy.

## 4. DELIVERY OF THE PLACENTA

Here too, any harmful act must be avoided. This fourth phase of childbirth requires the same attitude as the rest : surveillance of the woman, based on an understanding of the mechanism involved and of the accidents, some dramatic, which may complicate it. Too many women still die for lack of surveillance during delivery of the placenta.

**The physiological mechanism of delivery of the placenta** : the passive retraction of the uterine muscle after the expulsion of the foetus causes a shrinking of the placenta. Simultaneously, the placenta is detached and a haematoma formed. Last, the uterine contractions are resumed, after a period of physiological rest, and push the detached placenta toward the vagina. Two types of delivery have been described : Baudelocque's position and Duncan's position (fig. 16). The latter presents a greater risk of retention of the placenta.



Delivery of the placenta. Baudelocque's position, by evagination.

Delivery of the placenta. Duncan's position, by sliding.

**Figure 16 : delivery of the placenta**

Source : C. RACINET, J. BERTHET. Délivrance normale et pathologique. Encycl. Méd. Chir. Paris. Obstétrique 5108 $M^{10}$, 5. 1982.

**Course and management of normal delivery of the placenta**

Immediately after the baby's birth the uterus retracts and seems globular. Its summit is near the navel. Uterine contractions then resume (20 to 30 minutes after childbirth). The uterus is then above the navel and blood is seen on the vulva.

The detachment may be confirmed by the observation of the lengthening of the part of the cord located outside of the vulva. A counter-pressure manoeuvre may also be performed : the right hand maintains slight tension on the cord **without ever pulling on the cord,** while the left hand, placed above the symphysis, pushes the body of the uterus upward. The detachment is confirmed when the cord does not move up with the uterus.

When detachment has clearly occurred, the woman needs only make some moderate effort at pushing and the placenta is expelled. The birth attendant is then passive. It is also possible to seize the fundus of the uterus with the palm of the left hand, to return it to its median axis and to push it back and downward while the right hand holds the cord slightly taut so as to guide it out. This can only be done in case of definite detachment, and the attendant is then active. The cord should never be pulled, for it may be torn out, or the placenta or the membranes torn ; either accident requires artificial delivery of the placenta (see paragraph 4.6.).

In any case, once the placenta is expelled it must be very carefully examined to make sure it is whole (cotyledons and membranes must be present). A retention of the membranes or of the cotyledons should be suspected, in particular, when the placenta arrives at the vulva in Duncan's position (maternal side first).

Last, the presence of a satisfactory **uterine globe** should be checked immediately after the placenta is expelled. The retracted uterus forms a hard ball located between the symphysis and the navel. The woman's blood pressure is taken.

This is the time to make sure the perineum has not been lacerated, or to carefully suture an episiotomy. Indeed, anatomically speaking, the perineum represents the main supportive element for the female pelvic organs (the bladder and the uterus) and functionally speaking it plays an important role in expulsion. Its integrity or complete repair is therefore important for subsequent pregnancies and to prevent genital prolapse.

A woman who has given birth must be kept under surveillance for several hours : her blood pressure and pulse should be taken regularly, her abdomen palpated (to determine the presence of the uterine globe), and the absence of haemorrhage visible on the vulva should be verified.

**Anomalies in delivery of the placenta**

4.1. Complete retention of the placenta

We speak of complete retention of the placenta when the placenta has not been expelled 30 minutes after the birth of the baby. The placenta may not be detached, or it may be detached and retained in the uterus. In the latter case, manual delivery is sufficient, provided we are sure of the detachment : if necessary, uterine contractions

are obtained by continued administration of Syntocinon$^{R}$ IV, if a perfusion has been begun, or by an IM injection of 0.20 mg of methylergobasine (Methergin$^{R}$) (1).

However, when detachment of the placenta has not been confirmed by the counter-pressure manoeuvre (the cord is clearly pulled up when the uterine mass is pushed upward), **artificial delivery** (2) is required before haemorrhaging occurs, for the latter soon becomes dramatic for the woman.

4.2. Incomplete retention of the placenta

Examination of the placenta shows that one or several cotyledons or a part of the membranes is missing. The uterus remains large and blood continues to flow at the vulvar level. Immediate **manual inspection of the uterus** (3) is required, usually without general anaesthesia, following the same rules as for asepsis in artificial delivery of the placenta.

**Intrauterine curettage using an instrument should never be practiced after childbirth, for there is a great risk of perforation of the uterus, resulting in death of the woman due to internal haemorrhaging.**

4.3. Postpartum haemorrhage

It may be **immediate**, even after apparently complete delivery, or **retarded** (several hours after childbirth), making surveillance after childbirth necessary (blood pressure, pulse, abdominal palpation). It may be **external**, with red blood seen on the vulva, or **intrauterine**, and the uterus increases in volume and is soft, with much clotted blood appearing on the vulva after manual expression. It is accompanied by lowered blood pressure, quickened pulse, paleness and thirst, and may produce shock, often occuring suddenly.

This requires emergency treatment, combining :

— an energetic abdominal massage of the fundus of the uterus ;
— the establishment of an intravenous perfusion allowing the rapid passage of plasma volume expander (large molecules and **fresh blood**) ;
— placing of a speculum so as to eliminate any vaginal cause (rupture of a varix, laceration) or cervical cause (laceration). Injuries require surgical suturing or, at the least, compression by as many intravaginal compresses as possible ;
— making sure the uterus is empty, by manual inspection of the uterus. The hand inside the uterus evacuates all of the accumulated clotted blood which prevents uterine retraction. It also stimulates retraction by an intrauterine massage ;
— the use of oxytocics (see Appendix 3) :
Methergine$^{R}$ IM or DIV (1 ampule = 0.20 mg)
Syntocinon$^{R}$ in continuous perfusion (10 IU in 250 cc of isotonic glucosose) or 5 or 10 IU directly in the uterine muscle through the abdominal wall ; the injection is guided by the hand in the uterus (fig. 17).

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(1) Appendix 3.

(2) See paragraph 4.6.

(3) Manual inspection of the uterus : the hand is introduced into the uterine cavity to make sure that the uterus is empty, or to empty it. The rules for asepsis and the technique are the same as for artificial delivery of the placenta (see paragraph 4.6).

All of these acts may by performed by specialized workers in small units, provided the rules are respected, especially those required for asepsis. In those rare cases where this is ineffective, a last attempt may be made by placing 3 or 4 Museux clamps on the cervix, so as to exert **traction in a spiral course on the cervix**, after which the woman is transferred to a surgical unit while manual compression is maintained on the abdominal aorta. The treatment of retention of the placenta or of postpartum haemorrhaging is always an **emergency**, and the strict application of these few rules should save the lives of many mothers who would otherwise die of these disorders.

4.4. Uterine inversion

This is a rare complication in which the uterus turns inside out like a glove. The fundus is then seen near the cervix, the vagina or the vulva.

This may be caused by great relaxation of the suspensive ligaments when childbirth is very rapid or occurs in a standing position. A medical error is usually involved : an excessively active massage of the fundus of the uterus or untimely pulling on the cord when the placenta is closely adhering to the fundus.

It is accompanied by extremely sudden shock.

Emergency treatment must be given : general anaesthesia, reversion of the uterine fundus following artificial delivery of the placenta, oxytocics.

4.5. Prevention during delivery of the placenta

The physiological mechanism of delivery of the placenta must be understood :

— in case of a past history of postpartum haemorrhage or of retention of the placenta, or a tendency to uterine inertia (**woman having borne many children, twin pregnancy, hydramnios, large baby**), an IM injection of methylergobasine (Methergine$^{R}$, 1 ampule = 0.20 mg) must be done as soon as the shouiders have come out ;
— do not abandon the woman after the birth of the child ;
— be capable of recognizing placental detachment ;
— never pull on the cord ;
— always examine the placenta and the membranes carefully after their delivery ;
— massage the uterus and make sure it is globular after delivery of the placenta ;
— check for any perineal, vaginal or cervical injury after childbirth ;
— do not wait more than 45 minutes before performing artificial delivery of the placenta.

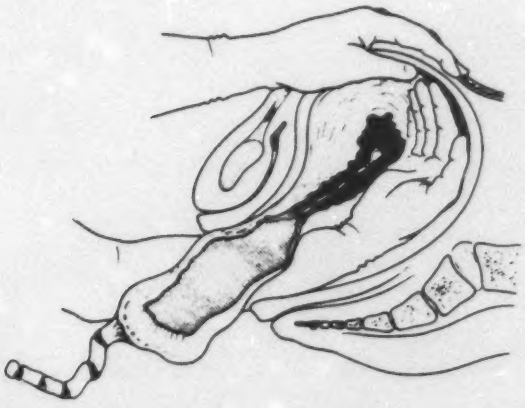
**If the childbirth takes place at home**

Never pull on the cord, and transfer the woman to a hospital if the placenta is not expelled or if she is bleeding.

4.6. Artificial delivery of the placenta

Artificial delivery is performed under general anaesthesia or if this is impossible, under analgesia using pethidine (Dolosal$^{R}$, 50 mg in slow IV). The attendant washes his/her hands carefully, using soap and a brush, then rinces them in alcohol before putting on sterile gloves. The woman is placed in the gynaecological position and the vulvar region is washed with soap and water. If possible, drapes should be used. The right hand (for the right-handed) enters the vagina and the uterus in the "obstetrician's hand" position (palm in adduction, fingers slightly flexed). The other hand

seizes the fundus of the uterus, places it in the median axis of the abdomen and holds it firmly in that position. The hand in the uterus then gently separates the placenta from the uterine muscle, using the cubital rim of the hand. When the placenta is completely detached, it is firmly grasped and slowly extracted (fig. 17).



Source : C. RACINET, J. BERTHET. Délivrance normale et pathologique. Encycl. Méd. Chir. Paris. Obstétrique 5108 M[10], 5. 1982.

**Figure 17 : the technique of artificial delivery of the placenta**

Artificial delivery of the placenta is usually followed by inspection of the uterus, after a change of gloves or thorough cleansing of them using an antiseptic. Uterine retraction generally prevents the entire hand from entering the uterus, in which case two or three fingers are used to make sure that the uterus is empty.

We have now seen what surveillance is desirable during childbirth in a maternity unit, and we wish to end this chapter by emphasizing the prevention of the two main risks in developing countries : **rupture of the uterus and umbilical tetanus**. Not all women give birth in maternity units, and we shall conclude with a description of the management of childbirth at home.

## 5. PREVENTION OF RUPTURE OF THE UTERUS

This accident, dramatic for the child (80 % mortality) and often for the mother as well (40 % mortality), is a typical example of a still frequent pathological condition which should be considerably diminished by the proper surveillance of pregnancy and childbirth.

**During pregnancy**, through the detection of women running a risk of uterine rupture : those with a pelvic anomaly, those with a scar produced by a caesarean section, who have borne many children or who have a history of a still-born baby.

During childbirth, through the **surveillance** of the duration of labour ("the sun should never set twice on the same labour"), the mother's general state and the detection of foetal suffering. We must also **know how to recognize** the signs preceding the rupture : strong pain near a scar, uterine contractions at very short intervals producing tetanization of the uterus, which takes the shape of an hour-glass (Bandl Fromel's ring). In all such cases, the woman should immediately be transferred to a surgical unit. We must also know how to use oxytocics without excess : there is no use in attempting to stimulate uterine contractions if the pelvis is too narrow or the presenting part dystocic. Untimely extraction manoeuvres shoud be avoided and attendants should be capable of performing routine uterine inspection when childbirth has been long and difficult.

## 6. PREVENTION OF UMBILICAL TETANUS

Here too, prevention is possible during pregnancy :

— vaccination of all women who are not immunized against tetanus (2 injections of antitetanus vaccine at a 6-week interval, with the second injection at least two weeks before childbirth). These injections should be very carefully noted on the individual record card ;
— during childbirth, the cord should be cut aseptically and the navel given repeated, thorough care.

Neonatal tetanus should be suspected if the baby does not suck properly and/or has convulsions.

## 7. WHEN CHILDBIRTH TAKES PLACE AT HOME

Although our aim is to achieve the surveillance of all pregnancies and deliveries by specialized workers operating in properly equipped facilities, this is no reason to neglect those births which take place at home, for there too, some simple rules may be taught to the village birth attendants and may considerably contribute to decreasing the risks for mother and child. For this reason, traditional birth attendants should be given training corresponding to the objectives very well defined by J. Garcia (Méd. Trop. **41** n° 4 pp 279-383) :

— a general familiarity with the course of a normal pregnancy, hygiene and nutrition, the main diseases during pregnancy (vomiting, anaemia, oedema, malaria, haemorrhage) ;
— how to recognize the risk of dystocia : short women, those who limp, have a "man's pelvis" or a past history of difficult childbirth or still-born babies.

For the birthing, the attendant should go to the woman's home as soon as the first pains occur and prepare clean loincloths, boiled water and her equipment (new razor blades, thread dipped in alcohol), and wash and brush her hands, using soap.

During childbirth, some rules should **always** be respected :

— never press on the woman's belly ;
— never allow "the sun to set twice on a woman in labour" ;
— never have the woman push if "her waters have not come out" ;
— never pull on "what is hanging out".

If a complication exists, the woman should be referred to a maternity unit rapidly :

— rupture of the membranes, with no onset of labour 1 or 2 hours later ;
— abnormal bleeding at any point of childbirth, or if the woman becomes pale and weak ;
— the waters are coloured ;
— when a primipara has not delivered one day **and** one night (24 h) after the onset of labour ;
— when a multipara has not delivered one day **or** one night (12 h) after the onset of labour ;
— the baby comes out "otherwise than by the head or the buttocks" ;
— the uterus becomes hard during labour ;
— the woman "is torn" when the baby comes out ;
— the placenta has not come out one hour after childbirth or it is not whole ;
— the woman bleeds after childbirth and the belly remains big after delivery of the placenta ;
— whenever fever occurs.

**First care for the baby**

— wipe its mouth with a clean loincloth if it is filled with water ;
— never put anything but alcohol on the cord ;
— rub the baby energetically if it does not cry immediately ;
— put a drop of argyrol or lemon juice in each eye ;
— wash and dry the baby thoroughly.

# IV. SURVEILLANCE OF THE PUERPERIUM

This surveillance is not a luxury ; it is a necessity, since the pathological conditions which may develop during this period are sometimes quite serious and may threaten the mother's life or her health and future possibility of pregnancy. In addition, while the woman rests up from her pregnancy and childbirth, she is experiencing the new situation created by the birth of her baby. Aside from the role of medical surveillance, this is a crucial period for the mother-child relationship, and here too, the health team has a major educational and psychological role to play.

The puerperal period should not be one of hospitalization. Recently birthed women may be allowed to live together in a nearby building, so that they are totally independent. This makes contact with the health team quite easy.

## 1. THE PHYSIOLOGICAL ASPECT

The puerperium is characterized by :

— **uterine involution** (the uterus returns to its state prior to pregnancy), which takes two months, with the disappearance of the lower segment and the reconstitution of the cervix ;
— the **regeneration of the endometrial mucosa**, the modification of the vaginal mucosa ;
— the **decrease in hormone impregnation** (oestrogens and progesterone) and the reappearance of the ovarian cycle.

## 2. MEDICAL SURVEILLANCE

Medical surveillance during the days following childbirth is concerned with :

— **the woman's general state :**
- her blood pressure and pulse, and the colour of the mucosa are used to detect **anaemia**, and occasionally haemorrhaging ;
- her temperature : any anomaly may be indicative of **endometritis** (given the fact that the beginning of lactation may well explain a rise in temperature on the 3rd or 4 th day) ;
- inspection of the venous network on her lower limbs, vulva and true pelvis (by vaginal examination) to detect venous oedema, varices or worse, **phlebitis** (pain, rapid pulse with no rise in temperature), to which anaemia contributes greatly, or again, a bout of haemorrhoids ;
- **urinary retention** due to an atonic bladder (possibly complicated by infection) or constipation may even be discovered.

— **uterine involution :**
- the volume of the uterus decreases daily, and on the 7th day the fundus is located halfway between the pubis and the navel ;
- the cervix closes gradually over a 2-week period ;
- the lochia, bloody and fluid at the beginning, decrease in volume and become serohaemorrhagic, pink, at the end of the first week.

This evolution of the uterus is favoured by abdominal massaging of the uterus after delivery, and if this is not sufficient, by the administration of Methergine[R] (orally, in drops, or IM), so as to obtain a "safe" uterine globe. A uterus that remains large, soft and painful, abundant and/or foul-smelling lochia are indicative of **endometritis** which should be treated by a combination of uterotonics (Methergine) and antibiotics.

— **the state of the perineum** : ordinary washing for an intact perineum, careful, twice-daily washing for a scarred perineum (laceration or episiotomy) and removal of the non-resorbable thread on the 7th day.

### 3. PREVENTION

The prevention of puerperal complications is based on four golden rules (summarized as follows) :

— **asepsis in the delivery room** (washing of hands, brushing of nails, sterile gloves and fingerstalls, sterile instruments, clean blouses, clean rooms, etc.) is the only way of preventing infections in mother and child, still too often fatal ;
— a **safe uterine globe**, achieved by massaging (and uterotonics when needed) so as to expel the intrauterine blood clots which encourage haemorrhaging and prepare the way for endometritis ;
— **early rising**, which prevents thrombo-phlebitis of the lower limbs and of the true pelvis, uterine inertia and constipation (attention should be paid to anaemic multiparas) ;
— **the correction of anaemia** (confirmed by a blood count), by administering iron or by isogroup, iso rhesus blood transfusion.

### 4. RESUMPTION OF MENSES

It is delayed in women who breast-feed (between the 2nd and 5th month). In women who do not breast-feed it usually occurs between the 6th and the 8th week. Some authors have observed a much longer postpartum amenorrhoea in severely undernourished women. Resumption of menstruation is a specific, individual occurrence, and great differences exist. Breast-feeding is not a reliable contraceptive method.

It resembles normal menstruation but may be more abundant or more prolonged. When it is **haemorrhagic** an **infection** should be suspected if the uterine involution is unsatisfactory and the uterus painful. Antibiotherapy should be undertaken immediately. In a few cases this is caused by retention of the placenta, and in any case curettage is formally contra-indicated due to the risk of uterine perforation or synechiae (1).

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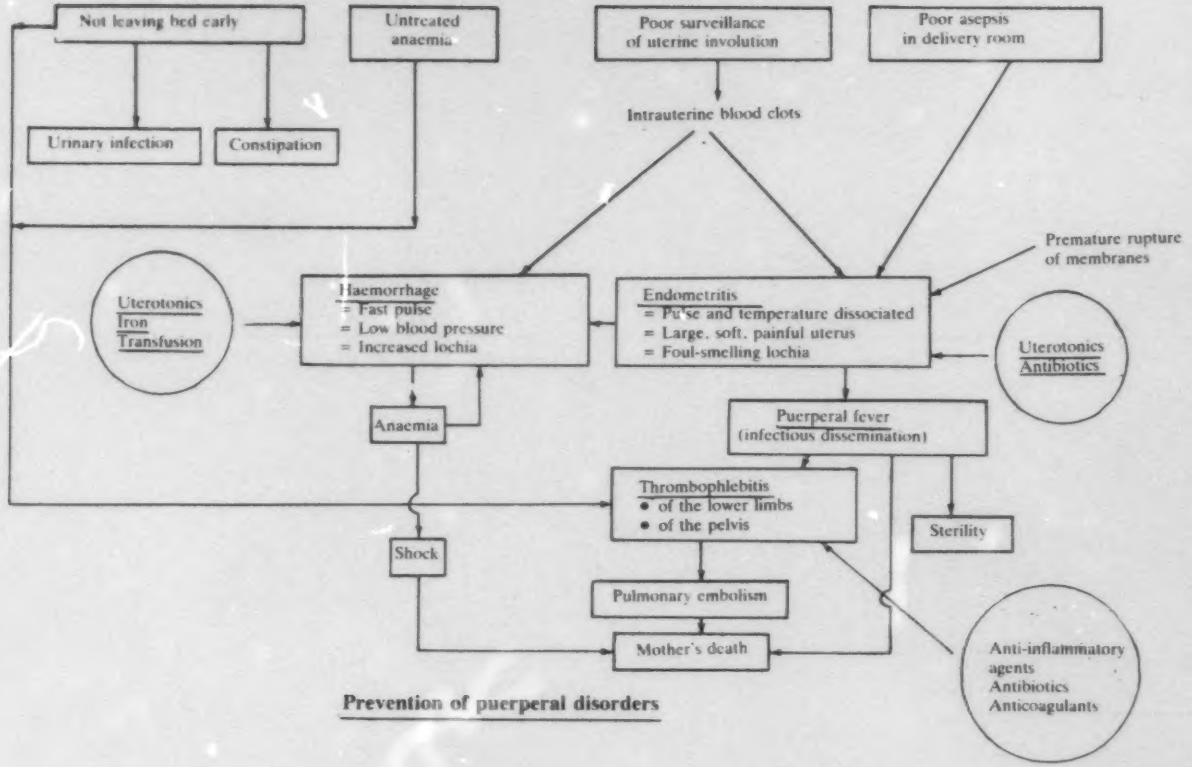
(1) Synechiae : cicatricial adhesion of the two uterine faces, causing definitive sterility. Traumatic curettage and endometritis (tuberculosis) are responsible for this condition.




**Prevention of puerperal disorders**

## 5. BREAST-FEEDING

The reader had best refer to issue 138/139/140 of our journal, devoted to how to feed young children. We will simply review the main advantages of breast-feeding.

### 5.1. Nutritional advantages

In the developing countries, mother's milk favours better height and weight growth. The neonatal period is a crucial one for the psychological, emotional and neurological development of the infant, and malnutrition during this period may have disastrous effects on his/her future (reduced brain size, damaged cerebellum, etc.).

The quantity and composition of mother's milk (fats and vitamins) depend upon the quality of the mother's diet (fatty reserves stored up during pregnancy and protein-calorie diet during lactation). The health team should be concerned with dietaty counselling and supplementation, when needed, during prenatal visits and after childbirth. However, the amount of milk also depends upon the frequency, duration and vigour of sucking. The health team should also be concerned with the preparation of the breasts before childbirth, putting the baby to the breast early and teaching the young mother about breast-feeding.

### 5.2. The anti-infectious role of mother's milk

This makes breast-feeding most valuable, for the increased occurrence of infections in undernourished children is well known.

**Leukocytes** are present in large quantities :

- **macrophages** (90 %) : phagocytosis of intestinal bacteria, secretion of lysozyme which attacks some colibacilli and salmonellas, secretion of lactoferrin, which has a bacteriostatic effect on pathogenic colibacilli, staphylococci and candida albicans ;
- **lymphocytes** : protection against allergic diseases. The IgA constitute the majority of the immunoglobulins in human milk. Their activity is directed against enterobacteria and enteroviruses and to a lesser extent against streptococci, staphylococci, pneumococci and some viruses (poliomyelitis, coxsackie, rotavirus). The IgAS (fractions of the IgA) in the mother's milk provide passive immunization of the child, protecting him/her against those germs to which the mother herself is immunized.

The bifidus factor facilitates the intestinal proliferation of the lactobacilli, which protect the intestinal mucosa by maintaining an acid pH, while facilitating the absorption of proteins, calcium and iron. Here too, mother's milk is far superior to cow's milk, particularly since breast-feeding eliminates manipulations ; the bottle and nipple are much greater sources of infection than the breast.

### 5.3. Financial advantages

This of course is not a negligible factor in underprivileged strata (material gain an gain in time). These advantages are also seen at the community level, since the decrease in marasmus, achieved by breast-feeding, results in the lowering of the high cost of running nutritional rehabilitation centres.

It costs less to provide dietary supplements for pregnant and nursing women than to provide commercial milk, and it increases the amount of milk produced by the mother.

5.4. Psychological and emotional advantages

Loss of the mother, the object of love, causes an emotional deprival in the child which may in fact be fatal. Now, the newborn baby first feels the mother's presence through skin to skin contact, a feeling of warmth and her odour.

We have only to observe the behaviour of the newborn baby placed on its mother's belly immediately after birth to understand this contact (to which the rooting and sucking reflexes contribute considerably) and its importance for the infant's psychological and emotional balance. This scene irresistibly suggests that it is a prolongation of the mother-child intimacy experienced during the child's intrauterine life.

Thus, breast-feeding is not only a response to the baby's need for food. It is much more than that : it is an important part of the panoply of mother-child relations.

For the mother, breast-feeding is not a neutral act : on the contrary, for her too it is an emotionally rich act and women often delight in telling of their pleasure in breast-feeding. This fact, easily verified by the observation of the effects of maternal anxiety on the success of breast-feeding, explains the importance of the mother's motivation.

This latter may depend, to a large extent, upon the way in which the medical team approached the subject during the woman's pregnancy and the attention paid to the child's first contacts with the breast.

In conclusion, for those who are sceptical, it should be said that if the only reason for breast-feeding was the decreased incidence of marasmus, that in itself would be amply sufficient justification, for the suffering experienced by a severely undernourished child influences his/her behaviour throughout his/her life.

These advantages place breast-feeding at the head of the preventive measures to be implemented for the satisfactory development of the newborn baby. Once again, breast-feeding should be prepared for throughout pregnancy, during the prenatal visits. These talks should deal with the overall problem of the infant's diet, and should broach one crucial point : weaning. As we have already said in the chapter on the surveillance of pregnancy, the beginning of pregnancy is very often the time when the mother weans her last-born (many people believe that the milk of a pregnant woman becomes "bad"). The consequences, sometimes dramatic, of early weaning are now well known : kwashiorkor, the major form of protein deficiency. Another part of prevention involves the explanation of the rules of weaning, which is connected with the question of dietary taboos in case of diarrhoea, measles, etc.

# V. PLANNED PARENTHOOD

Planned parenthood is an objective to be written into every preventive policy, since several studies done in different parts of the world show that pregnancies at excessively short intervals contribute to the risk of death for both the mother and the child.

The maternal mortality rate is quite high for the first pregnancy and decreases for the following ones, but it rises rapidly again from the fifth pregnancy on. It also increases with the mother's age and the number of prior pregnancies. Pregnancies at short intervals further multiply these risks, since the mother's body has not had enough time to replenish its reserves, and we have seen the seriousness of **anaemia** and **malnutrition** in pregnant women.

Infantile mortality, which increases with parity and the mother's age, also depends on the mother's health status during her pregnancy, of course. This health status is severely threatened by frequent pregnancies.

The ideal interval between two pregnancies seems to be two years. What can we propose to a woman who has just given birth ?

**Male contraception** : the **condom** is remarkably effective, provided its quality is satisfactory, and it is inexpensive. In addition, it helps to combat venereal contamination.

**Female contraception**

**a) Cervical chemical barriers :**

Spermicidal jelly, placed on the cervix before intercourse, is an excellent puerperal contraceptive method, but the woman must remember to apply it, and must learn how to do so.

The pharmatex plug, which may be retained for 24 hours, but for which there is still a problem of cost.

**b) The intrauterine device** (IUD) or coil : it may be inserted 10 days after delivery when uterine involution is satisfactory and in the absence of any gynaecological infection. The risk of expulsion is greater at that time, and many people prefer to wait until resumption of the menses to insert it. The medical workers must learn to insert it. Strict medical surveillance is required during the two years of use (consultations to check on its location and the absence of infection).

**c) The hormonal contraceptive methods :**

**The low-dose pills** (progestogen only) : these are effective during the immediate postpartum period, but must be replaced by an oestrogen-progestogen pill after the resumption of the menses. They have no side effects and may be prescribed for women for whom oestrogen-progestogen pills are contra-indicated (high blood pressure, heart disease, etc.). Their main disadvantage resides in the need to take them daily at a set time.

**The oestrogen-progestogen pills** : the mini-dosed types are preferable. They are just as effective but reduce the cardio-vascular risks (Minidril[R], Adepal[R], etc.). Their contra-indications must be known and they should only be prescribed after a **clinical** examination which eliminates cases of breast nodes, high blood pressure, heart disease, and a **biological** examination (cholesterolaemia, triglyceridaemia, glycaemia and coagulation factors). This contraceptive method, requiring regular intake with no forgetfulness, can only be prescribed for women who understand how to use it. It is contra-indicated for the immediate postpartum period.

**The injectable progestation hormones** : there are two types :

- Long-acting Medroxyprogesterone (AMPR) = Depo-prodasone[R] 150 mg IM or Depo provera[R] 200 mg (1 ampule each trimester) ;
- Norethisterone Enantate (EN-NET) = Noristerat[R] 100 mg IM (1 ampule every 2 months for the first four injections, then every 3 months).

These represent an effective contraceptive method, usable during the immediate postpartum and which does not disturb the milk production. Their main disadvantage is the frequent occurrence of bleeding, sometimes prolonged, and which may then result in exhaustion of the iron reserves. When the injections are stopped, fertility only reappears 5.5 months later, on the average, whereas it is resumed 4.5 and 3.5 months after suppression of the IUD and the pill, respectively. They require no medical surveillance, and represent a highly recommended contraceptive method for the developing countries (1).

Last, present-day research on **day-after contraception** will no doubt come to fruit some day. This is an anti-hormone (RU 486), which counters the effects of progesterone, and therefore counters gestation. There is no doubt that these substances would be most valuable for the developing countries.

The choice of a method should be made after discussion of its advantages and disadvantages with the woman, and be adapted to each case. Since planned parenthood is a part of the preventive action for mother and child care, it is the concern of the health team, and the subject should be discussed with all pregnant women during the prenatal and puerperium visits.

Last, planned parenthood also means informing adolescent girls, since the maternal and infantile mortality rates are known to be higher in the 15-20 year-old age group.

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(1) WHO Bulletin, 60 (4) : 535-548 (1982).

# APPENDIX 1 : NUTRITION AND PREGNANCY

Various worldwide studies have confirmed the importance of a satisfactory maternal nutritional status in any attempt to lower the perinatal mortality and morbidity rates.

In the developing countries, women have an average calorie intake of 1,400 to 2,100 Kcal/day, whereas their normal requirements, outside of pregnancy, may be evaluated at 2,000 to 2,500 Kcal/day. Pregnancy leads to an overall increase in these calorie requirements, estimated by the WHO at an average daily increment of 150 Kcal/day during the first trimester and 350 Kcal/day during the last two trimesters. Of course this all depends on the woman's nutritional status at the beginning of her pregnancy.

The relationship between chronic undernourishment of the mother and low birth weight and prematurity in the baby is well known, with all of the risks inherent in these occurrences. It has long been known that the baby's birth weight and the mother's milk are significantly increased when the pregnant woman is given a dietary supplement (1).

Clinically speaking, a nil or slight weight gain during pregnancy, quite frequent in some areas, may cause retarded intrauterine growth (foetal hypotrophy, measured by the uterine height and the umbilical circumference) and premature delivery. The perinatal mortality curve is at its lowest point for a maternal weight gain of 9 to 12 kg during pregnancy.

"Nutrition concern" is therefore a truly preventive action for the health team :

- measurement of the mother's skin fold, detection of insufficient weight growth, insufficient growth of the uterine height and umbilical circumference ;
- questioning on eating habits ;
- nutrition education for pregnant women ;
- calorie supplementation.

The work done at the prenatal consultation must be based on a proper understanding of the nutritional requirements of pregnant women. Two goals must be achieved : to increase the calorie intake during pregnancy and to diversify the diet. Both depend, of course, on the local food possibilities. Sometimes an effective attempt to eliminate harmful "food taboos" may improve the situation somewhat.

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(1) VAYSSE Marie-Noëlle. La malnutrition protéino-énergétique de l'enfant béninois. Thesis. Lyon 1983. Bibliography.

**The protein requirements (1)**

**Proteins are not stored by the body**. We must therefore achieve a positive balance during pregnancy (intake greater than expenditure) for the building of new tissue. The protein productivity of different foods may vary considerably, depending on whether they are of plant origin (35 %) or animal origin (70 %). The diet should contain about **90 to 120 g of protein every day.**

**The carbohydrate requirements**

Carbohydrates are a source of energy and should constitute 50 to 60 % of the calorie intake. In poor countries, they often represent 60 to 80 % or more of the calorie intake.

**The lipid requirements**

Lipids are the most energy-rich foods (9 calories for 1 gramme). They should provide 25 to 30 % of the total energy intake, or **70 to 90 g/day.** Some of the fatty acids contained in the lipids are essential to life, and to many physiological mechanisms (the prostaglandins, for instance). They must therefore be present in the diet in sufficient quantities.

**The calcium and phosphorus requirements**

These requirements are increased by the development of the foetal skeleton, but a balanced diet containing milk and milk products, in particular, is sufficient (**1.2 to 1.5 g/day**).

**The iron requirements**

These requirements are evaluated at 1,200 g for the duration of pregnancy. They are needed for the increased mass of the mother's blood, the constitution of the child's reserves and to repair the blood losses involved in childbirth. These needs are therefore great, while the mother only has 300 mg in reserve.

In tropical countries, parasitoses (bilharziasis and ancylostomiasis in particular) may cause great losses of iron. It should be added that a woman who is often pregnant is unable to reconstitute her iron reserves (this is "deficiency due to excessive use".

This partially explains the great prevalence of **iron-deficient anaemia in pregnant women** in the developing countries. It ranges from 20 to 80 % in some regions, and its frequency is not negligible in the industrialized countries.

The **prevention** of this widespread iron-deficient anaemia therefore involves the control of parasitoses, planned parenthood and nutrition education, so that the available resources may be used as best possible (iron-rich plant foods such as green vegetables, leafy vegetables, beans, fish, meat). Such actions are not necessarily rapidly appliable. In the short term, then, iron supplementation must be provided, using two methods : the iron enrichment of a vehicle food eaten by all population groups and especially the most underprivileged groups, so as to reach the entire population, and the distribution of iron pills to pregnant women.

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(1) Cf. issues 138/139/140 and 147/148 of our journal for the nutritional value of foods.

**The vitamin requirements**

Vitamins are indispensable for many enzyme systems.

Vitamin A : requirements evaluated at 2 g/day (palm oil, plants, milk, mangoes, papayas, etc.)

Vitamin D : 400 IU/day, needed for phospho-calcic metabolism.

Vitamin C : increased needs during pregnancy, equivalent to 100-200 mg/day. Its presence **contributes to the absorption of iron**. It is present in guavas, mangoes, oranges, lemons, green leaves, okra, as well as plantain bananas, sweet potatoes, etc.

**The trace elements** (iodine, fluorine, magnesium, copper, zinc, etc.). These are provided by the protective foods.

The health team should therefore be greatly concerned with the diet of the pregnant woman. The course of pregnancy and the growth of the foetus depend upon it. We cannot envision prevention of obstetrical risks, the aim of which, as we remember, is to reduce maternal and neonatal mortality, without considering this question. This indicates the importance of collaboration between the public health teams and the nutrition teams.

# APPENDIX 2 : MEDICATION AND PREGNANCY

Practically all medications cross the placenta, with the exception of heparin, insulin and curariform drugs. All, then, will "affect" the foetus, and the latter is very difficult to study, for many reasons.

**The first rule**, with respect to a pregnant woman, is therefore not to give any medication, and in case of a pathological condition, to give only the indispensable medication, after carefully weighing the risks.

**The second rule** is to combat, by all available means, self-medication by pregnant women (and by the rest of the population). This widesp. ad practice may be dangerous for two reasons : it may produce harmful effects on the mother and/or the foetus, and may also delay consultation for complications linked with the pregnancy, as well.

**The third rule** is that the medical workers must be well aware of what they are doing when they prescribe a medication. This means being familiar with the list of those which are not harmful and those which must be handled with great caution, as well as those which are formally contra-indicated during pregnancy. These lists may be posted in the consultation room and the pharmacies should be emptied of all dangerous medications.

**What are the harmful "effects" of medications ?**

A. **Medications possibly causing malformations**. They are most active during the period of embryogenesis (differentiation of the embryonic organs), that is during the first 12 weeks of pregnancy (3 months) :

— **synthetic progestational hormones** derived from nortestosterone (norsteroids) and continued hormonal contraception (the pill) after the onset of pregnancy : cardiopathies, multiple malformation ;
— **androgens** : virilization of female foetuses ;
— **lithium** : cardial malformations ;
— **anti-vitamin K** (anti-coagulant) : cerebromeningeal haemorrhages in the embryo, during pregnancy and especially during delivery (see heparin) ;
— **antimitotics** : medications which block cell division, used in the treatment of cancerous tumours ;
— **anti-epileptics** : almost all are incriminated, the most dangerous being phenobarbital and the hydantoins (Di-hydan$^{R}$) : cleft palate, skeletal cardial and neurological malformations ;
— **some neuroleptics** : (chlorpromazine : Largactil$^{R}$ ; methotrimeprazine : Nozinan$^{R}$) and anxiolytics (meprobamate : Equanil$^{R}$, Procalmadiol$^{R}$).

**B. Perinatal pharmacological effects of medications used during pregnancy**

1. Antibiotics

| Not recommended or contra-indicated | To be avoided except for short treatment | May be used |
|---|---|---|
| Tetracyclines<br>Sulfonamides (at the end of pregnancy)<br>Streptomycin, kanamycine<br>Rifampicine (first 3 months)<br>Nalidixic acid (Negram$^{R}$)<br>Trimethroprim (Bactrim$^{R}$) | Gentamycine<br>Tobramycine<br>Chloramphenicol | Penicillins<br>Cephalosporines<br>Macrolides<br>Nitrofurantoins |

The **beta-lactamines** (penicillins and cephalosporines) cross the placenta well, and are therefore valuable in treating an infection of the amniotic fluid.

The **macrolides** may have difficulty in crossing the placenta (erythromycin) or on the contrary, cross it very well (spiramycine : Rovamycine$^{R}$). Among the **antituberculosis drugs**, ethionamid (Trecator$^{R}$) is suspected of causing malformations of the central nervous system.

2. The antiprotozoans

Quinine may cause uterine contractions, but is not abortive. It is wise to avoid oral metronidazole (Flagyl$^{R}$) for the treatment of trichomonasis. The treatment and chemoprophylaxis of malaria have been discussed in a previous chapter.

3. The antifungal agents

They are not absorbed by the mucosa (digestive or vaginal) and are therefore not contra-indicated.

4. Vaccinations during pregnancy

| Recommended | With reservations | Not recommended |
|---|---|---|
| Tetanus<br>Polio (injectable) | Smallpox (revaccination)<br>Cholera<br>Diphtheria | Smallpox (primo-vaccination)<br>Rubella<br>BCG<br>Yellow fever<br>Pertussis<br>Typhoid fever<br>Oral polio |

**Summary of the main medications usable during pregnancy, according to some toxicological studies.**
**Caution should always be used in presribing medications during the 1st trimester of pregnancy**

| Disease | | Usable throughout pregnancy | With caution | Contra-indication |
|---|---|---|---|---|
| **Malaria** | Prevention<br>Feverish bout<br><br>Severe form | Flavoquine*<br>Nivaquine*<br>Quinine | Fansidar* I.M.<br><br>In perfusion under surveillance | |
| **Toxoplasmosis** | Seroconversion + | Rovamycin* | — | — |
| **Trypanosomiasis** | African<br><br>American | —<br><br>— | Moranyl*<br>Lomidine*<br>Lampit*<br>Randanil* | |
| **Amoebiasis** | Ascariasis | — | Flagyl*<br>Tiberal*<br>Dehydroemetine* | Derivatives of arsenic<br><br>Oxyquinoleines |
| **Helminthiasis** | | | | |
| **a) Nematodosis** | Ascariasis | Solaskyl*<br>Mintezol* | — | Combantrin* |
| | Ancylostomiasis | Alcopar*<br>Solaskyl*<br>Mintezol* | — | Combantrin* |
| | Anguillulosis | Povanyl* | | |
| | Oxyuriasis | Mintezol* | | |
| | Trichocephiasis | | | |
| | Trichinosis | | | |
| **b) Trematodiasis** | | | | |
| Bilharsiasis | | — | Ambilhar*<br>Vancil* | Anthiomaline*<br>Bilarcil* |
| | | — | Droncit*<br>Oltipraz* | not yet known |
| | | — | | — |
| Distomiasis | | | Dehydroemetine* | — |
| **c) Cestodiasis** | Taeniases | Crushed | Tremedine* | — |
| | Hydatidosis | marrow seeds | Mintezol* | Paludrine* |
| **Vaginal trichomonasis** | | Local vaginal suppositories Flagyl* | Flagyl* contra-indicated during 1st trimester | Flasigyne 500* |

Source : Soins Pathologie Tropicale n° 47 - Mai-juin 1984

5. The sexual hormones

We have seen the risk of malformation involved in the use of synthetic progestational hormones (norsteroids) and with androgens. Oestrogens (formerly used for threatened miscarriage) are now all contra-indicated during pregnancy (risk of genital cancer in the daughters of women who take oestrogens).

6. Corticosteroids

Their use during pregnancy should always be seriously weighed against the risk of neonatal suprarenal insufficiency. Present studies seem to indicate a decrease in cell mitosis (cell divisions) in the lungs and in some parts of the central nervous system.

Their use is justified in some **threats of premature** delivery, since they affect the maturation of the foetal lungs, but they increase the risk of infection (see Appendix 3).

7. Insulin

It does not cross the placenta. It is the only possible treatment of diabetes during pregnancy (with proper diet, of course). Hypoglycaemic sulfonamides should not be used.

8. Antihypertensors

The use of antihypertensors during pregnancy will be discussed in Appendix 3.

9. Diuretics

These are no longer used to treat high blood pressure during pregnancy, since they increase hypovolaemia. They are only really indicated in cases of decompensated heart disease. The thiazides may, in some rare cases, cause hydro-electric depletion accidents, but more frequently they decrease carbohydrate tolerance (they are diabetogenic) and hyperurinaemia. Furosemide is less well known, and is believed to decrease the utero-placental blood flow.

10. The beta-mimetics

These are studied in Appendix 3.

11. Anti-inflammatory agents

Aspirin$^{R}$ may be used. All other antiprostaglandins (indometarine, naproxen, fenoprofen, etc.) are not recommended, since they may be dangerous for the foetus (closing of the arterial duct, increased pulmonary blood pressure, kidney damage).

12. Anti-epileptic agents

As we have seen, there is a risk of malformation. However, epileptic women should be kept under treatment during pregnancy. During the last weeks of pregnancy, the routine administration of oral vitamin K1 along with the anti-epileptic is necessary, to prevent haemorrhaging.

13. Anticoagulant agents

Heparin, IV or subcutaneous, is harmless. Anti-vitamin K may be used during the 2nd trimester of pregnancy.

14. Antithyroid agents

Thyroid extracts or T4 (Thyroine$^{R}$) do not cross the placenta, and may therefore be prescribed. The synthetic antithyroid agents do cross the placenta, but in small amounts. The foetal risks seem to be slight (goitre, congenital hypothyroidism).

15. Iodine

This is formally contra-indicated during pregnancy, for it is bound by the foetal thyroid and causes congenital thyroid insufficiency or very large goitres. Medications containing iodine (cough medicines) should also be eliminated.

Since our knowledge is still incomplete, it is best to treat serious pathology only, and to combat self-medication and "market remedies".

# APPENDIX 3 : MEDICATION USED IN OBSTETRICS

## ANTICONVULSANTS

- Diazepan (Valium$^{R}$ : direct IV, 5 mg to be repeated, or IM, 10 to 20 mg).
- Phenobarbital (Gardenal$^{R}$), relaying valium, 20 cg IM.
- Magnesium sulfate (15 % Magnesium Lavoisier$^{R}$), 10 ml (1.5 g) and 20 ml (3 g) ampules : anticonvulsant and anti-cerebral oedema effect. Dose : 4 g in slow, direct IV, followed by 10 g IM of a 50 % solution (5 g in each buttock).

Magnesium sulfate potentializes the curariform agents, the doses of which should be cut in half to avoid neonatal respiratory depression. The antagonist of magnesium sulfate is calcium gluconate. Convulsions should be under control within 20 minutes with this method.

Anticonvulsants are used to prevent or control convulsions in fits of eclampsia. It is essential to control the blood pressure, and the use of diuretics may be indispensable. Such resuscitation can only be done in a properly equipped centre, otherwise the patient should be given emergency evacuation.

## ANTIHYPERTENSORS

— Alpha methyl dopa (Aldomet 250$^{R}$) = 1 to 6 pills/24 h.
— Dihydralazine (Nepressol$^{R}$) = 1 to 6 pills/24 h.
— Clonidine (Catapressan$^{R}$) = 1 to 6 pills/24 h.

It may be necessary to combine the administration of 2 or 3 antihypertensors, particularly when the diastolic pressure remains above 10 (15/10, for instance). A dose of one or two pills should first be given, with a gradual increase over several days if needed. Indeed, sudden maternal hypotension is very bad for the foetus.

In case of intractable high blood pressure a beta-blocking agent may be used (Propranodol = Avlocardyl$^{R}$ = 2 to 4 pills/24 h divided into 2 doses). These medications are contra-indicated in case of asthma, disordered heartbeat or brachycardia (heartbeat under 50 beats per minute).

Once again, the most effective treatment of high blood pressure during pregnancy is strict rest (lying on the left side), and the interruption of pregnancy in case of complication.

## ANTISPASMODICS

— Racefemine (Dysmalgine$^{R}$ in pill form) and Dextrofemine (Dysmalgine$^{R}$, injectable form = 50 mg ampules).

— N-Butyl hyoscine bromide (Buscopan$^{R}$) = Buscopan suppositories : 10 mg. At the beginning of labour or false labour, 3 suppositories at half-hour intervals ; injectable Buscopan : 20 mg ampule. During labour or at the end of dilatation, for cervical flexibility, to hasten dilatation : in IM or IV, along with Spasfon$^{R}$.

— Phloroglucinol (0.04 g) + trimethyl phloroglucinol (40 mcg) = Spasfon$^{R}$, injectable form, along with Buscopan during labour, IM or IV.

— Phloroglucinol (0.15 g) + trimethyl phloroglucinol (0.15 g) = Spasfon$^{R}$ suppositories at the beginning of labour or false labour (3 suppositories/24 h).

— Dipropyline (DCI) 0.08 g = Spasmaverine$^{R}$ suppositories. At the beginning of labour, it acts on the spasm and on pain. 1 suppository , repeated every 6 hours when necessary.

These are used during labour to improve the flexibility of a rigid cervix, to hasten dilatation and stop false labour. They may also eliminate after-pains.

**OXYTOCICS**

— Sparteine (Sparteine$^{R}$ = 5 and 10 cg ampules IM).

Sparteine induces uterine contractions. It is used to reinforce contractions during labour, or to start labour at term.

Dose : 1 ampule, 5 or 10 cg, IM. May be repeated one hour later (maximum dose 500 mg/24 h). Attention : an overdose may cause uterine hypertonia and foetal suffering. It should never be associated with a medication containing oxytocin (Syntocinon$^{R}$).

Since sparteine acts gently at the usual doses, its use is recommended in heart patients (except in case of a major disorder = bundle-branch heart-block), and when there is pulmonary pathology as well (respiratory insufficiency).

— Synthetic oxytocin : Syntocinon$^{R}$ = 2 and 5 IU ampules. In slow IV perfusion, the only route tolerated during labour. IM or intra-mural after delivery of the placenta.

Contra-indications for oxytocics :

— in case of a risk of uterine rupture : a mechanical obstacle (narrow pelvis, large child), scarred or fragile uterus (woman having borne many children), uterine hypertonia ;
— when the normal route is contra-indicated : abnormal presenting part (transverse, brow), central placenta praevia, severe foetal suffering at the beginning of labour.

Indications for oxytocics during pregnancy :

— **the syntocinon test**, which involves inducing uterine cont actions for a short period (one hour) so as to study the foetal behaviour (heart sounds) and detect foetal suffering. Can only be done in a properly equipped maternity unit ;
— **to induce labour**, provided the mother and the foetus are ready. Can only be done in a properly equipped maternity unit.

Indications for oxytocics during labour :

— **dynamic dystonia** : insufficient uterine contractions at the beginning of labour or during expulsion ; irregular, ineffective contractions with a dilated cervix ;
— **foetal suffering** requiring rapid expulsion ;
— **during delivery of the placenta**, to combat uterine hypotonia (haemorrhage).

**UTERINE RELAXANTS = BETA-MIMETICS**

- Salbutamol (Salbutamol[R] IV, IM, suppositories : Ventoline[R] pills).
- Ritodrine (Pré-par[R] IV, IM, pills).

Used in intravenous perfusion in case of serious threat of premature delivery, followed by oral ingestion.

Use caution in case of high blood pressure and diabetes (hyperglycaemi effect).

Their use should be preceded by heart auscultation. They are contra-indicated in case of heart murmur. They are also indicated in dynamic dystonia at the beginning of labour (to regularize contractions), or in case of uterine hypertonia.

**UTEROTONICS**

- Methylergometrine (Methergine[R] = IM, intra-mural or orally, in drops).

Its uterotonic action induces uterine contraction. Methergine therefore cannot be used during pregnancy or labour. It is indicated for haemorrhaging during delivery of the placenta, during the puerperal period or after uterine curettage for miscarriage. It may also be used for haemorrhages of uterine origin outside of pregnancy. The doses for oral intake are 10 to 20 drops three times daily.

# APPENDIX 4 : EQUIPMENT FOR THE CONSULTING ROOM AND THE DELIVERY ROOM

## THE CONSULTING ROOM

- Scales
- Flexible tape measure (or flexible, graded stick)
- Measuring stick (or a mark placed at 1.50 m on a wall, for example)
- Blood-pressure cuff
- Pinard's stethoscope
- Examining table
- Rubber fingerstalls
- Speculum

## LABORATORY

- Material for establishing blood group, rhesus
- Material for making haemoglobin count
- Reactive strips for albumin and urinary sugar
- Material for urinary cytobacteriological testing
- Material for parasitological and bacteriological examination of vaginal and faecal specimens
- Material for thick drop

## DELIVERY ROOM

- Clock
- Pinard's stethoscope
- Rubber fingerstalls
- Gloves
- Speculum
- Blood-pressure cuff
- Amnioscope
- Clamps and sterile scissors
- Surgical thread (resorbable and non-resorbable)
- Syringes
- Needles
- Alcohol
- Soap
- Brush
- Material for perfusion
- Forceps and/or vacuum extractor (ventouse)
- Paediatric material : vacuum pump for aspiration, paediatric scales.

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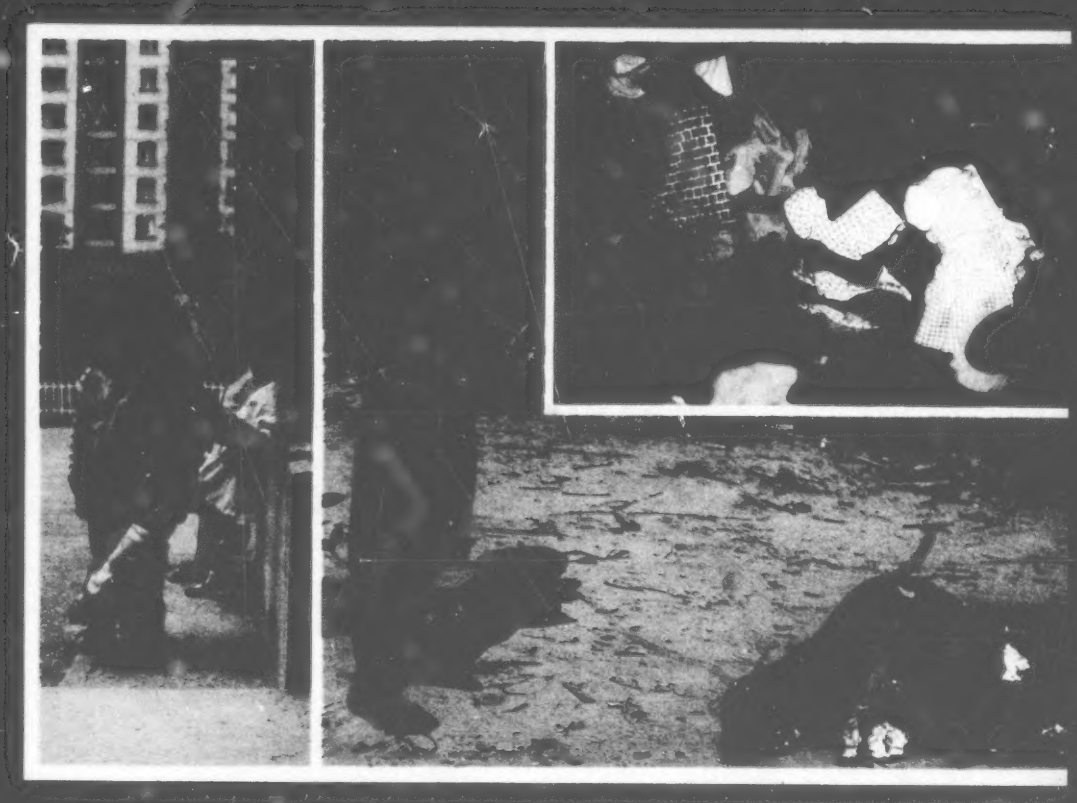

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